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Editor's Note

Dr. Dharmendra Kumar was to be the editor of these issues of the journal, as decided previously. Dr Kumar had practically taken charge of the journal from me, but unfortunately, due to ill health, he could not take up the responsibility of bringing out these issues. Part of the credit for bearing the responsibility of editing these issues rests upon Dr. Kumar, to whom I am indebted. In the effort to restart the task which was sort of concluded for me, it look some time to take off and realise. There had been technical difficulties in the management of the article reviews and being given the final shape for publishing. The financial constraints are a big a hurdle in regular publication and for that matter only, it would be noticed that we had to compromise. Now that the responsibility of editing is entrusted upon my shoulders once again, let's hope that the regularity of publication is warranted with a better epitome. I hope that the articles would keep pouring in as always.

From this time onwards, keeping up with the times and to ward off the problems of retyping and to ease the editing difficulties, we request all the future contributors to the journal to send in a floppy disk with the article, typed in Microsoft word, in addition to sending the printouts of the scripts. This shall help reduce down the publication time and also ensure reduction in typographical errors.

The readers are invited to write about the burning issues in the speciality to the editor to keep the dialogue open and to keep up the interest, these shall be published in the letters to the editor or open forum. Questions or further discussions on the articles published shall also be initiated from the forthcoming issue. Please also pass on the information about the events being organized locally or nationally.

Hope that you enjoy the twin issue of the Journal.

Dr. U. Singh

IJPMR 8-9, April 1997-98

The Effect of Relaxation and Relaxation with Resisted Exercises in Osteoarthrosis of Knee A Randomised Prospective and Comparative Study

Dr. S. Rastogi, Dr. T. Raghuram, Mrs. K. Mittal.

Abstract

One hundred and thirtyone cases of osteoarthrosis of the knee joint were randomly treated with relaxation exercises (Group A) and relaxation and resisted exercises (Group B) and followed up for more than eight weeks. 69.8% of Group A and 82.1% Group B patients showed excellent to good results. Relaxation and osteoarthosis and in those patients who could not relax. Weight reduction, proper understanding of instructions and follow up are also important factors in determining the outcome of the physiotherapeutic programme.

Keywords :
Exercises, Knee, Osteoarthrosis, Physiotherapy, Relaxation Exercises, Resisted Exercises.

Introduction

Osteoarthrosis of the knee joint is the commonest arthropathy in the Indian subcontinent as also elsewhere. In one survey (Lawrence et al, 1963), the prevalence of severe joint disease was 19% in men and 22% in women. Osteoarthrosis of the knee is usually primary. There is an increased water content and biochemical changes in the matrix of hyaline articular cartilage leading to cartilage loss, eburnation, subchondral cysts and osteophytes, eventually causing deformity and instability[3]. In any physiotherapeutic clinic these patients are treated by heat or cold and variety of exercise techniques [1]. It is obviously desirable that randomised prospective evaluation of new treatments are performed especially with large number of cases before it becomes established into the physiotherapeutic practice.

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In this study of 131 cases of primary osteoarthrosis of the knee, the results of clinical effectiveness of relaxation exercises and relaxation and resisted exercises are compared.

Method

The patients attending physiotherapy clinic of our outpatient department were selected for this study. The clinical and radiological evidence of primary osteoarthrosis were taken as the criteria for the diagnosis of osteoarthrosis [4] thus excluding all cases of secondary osteoarthrosis. The patients were randomly divided into two groups, A and B (Table 1 & 2). The exercise regime for Group 'A' consisted of Relaxation Exercises (by progressive Relaxation techniques) in sitting position, in supine position with hip and knee flexed and in prone position for 2-5 minutes each depending on the relaxing ability, along with thermotherapy (Short Wave Diathermy) for 20 minutes using the condenser field technique. All patients were instructed to continue these exercises at home 3-4 times daily.

Exercises for Group 'B' consisted of elaxation Exercises for two to seven days followed by Resisted: Exercises in the physiotherapy

Table 1 : Group-wise Distribution of Cases

S.No.	Sex	Group A	Group B	Total Number in each Sex	Percentage in each Sex
1.	Male	34	15	49	37.4%
2.	Female	52	30	82	62.6%

TOTAL NUMBER OF CASES : 131

Table 2 : Age and Sex-wise Distribution of Cases.

S.No.	Age Group	Male	Female	Total Number Of Cases in each age Group
1.	24 TO 35	3	8	11
2.	30 TO 60	38	40	78
3.	61 TO 80	8	34	42

TOTAL NUMBER OF CASES : 131

Table3 : Grading of the Result

S.No.	Grade of the Result	Score	Percentage of Improvement
1.	EXCELLENT	0-2	71% TO 100%
2.	GOOD	3-4	51% TO 70%
3.	FAIR	5-6	31% TO 50%
4.	POOR	More than 6	Less than 30%

department. Ten isotonic warm up contractions of the quadriceps starting at 90 flexion and proceeding through available pain free range of knee extension were carried out initially. Then the knee was kept in 40° - 60° flexion and manual resistance to extension was applied. The resistance was submaximal at first-three contractions each of half and three- fourth of 10 Repetition maximum. This was followed by-three sets of three maximal ten second quadriceps (isometric) contrations with three minutes interval between sets. The exercises were done with ten seconds hold each time. They were repeated in the physiotherapy clinic every alternate day for four weeks. Home programme consisted of self-resisted knee exercises at 40 -60 flexion of the knee.

Patients of both the groups were initially treated every alternate day for four weeks and then weekly. All the patients were reviewed weekly for four weeks and then again after four weeks.

Patients in both the groups were instructed in joint protection (precautions to be taken during sitting, standing, walking, toilet activities, stair climbing etc.) gait training, and using walking aids.

Assessment

All the patients were assessed by one of the authors before, during the treatment (every week) and later every four weeks. In these occasions, both objective and subjective evaluations were carried out . The objective factors assessed (by one of the authors) were joint movement, alignment, deformity, gait, squatting, cross leg sitting, stair climbing and exercise efficiency. The subjective factors assessed (and graded by the patient himself/ herself) were pain, tenderness, swelling, crepitus, morning stiffness and restriction of movement. All these factors were scored on a 0 to 10 scale (10 being poorest) and graded as in Table 3.

Results

The results which were analysed group and sexwise are shown in Table 4 and 5. In group A (using only relaxation excercises) there were 39.5% excellent and 30.3% good results. In group B (using relaxation and resisted exercises) there were 64.4% excellent and 17.7% good results.

Discussion

Osteoarthrosis is a painful and usually disabling condition affecting significant part of the middle age and elderly population. They are so frequently treated by a variety of physiotherapeutic measures that it becomes imperative and desirable to conduct controlled prospective trials to find out the efficacy of various techniques [4].

A variety of physiotherapeutic measures like thermotherapy [4], transcutaneous elertrical Nerve stimulation (TENS) [9] various exercise techniques [7,10] gait training and joint protection [1] are used. Many studies comparing efficacy of these techniques have been carried out in the past [4,5,8,11].

In this study, comparing relaxation exercises (Group A) with relaxation and resisted exercises (Group B) in the treatment: of osteoarthrosis of the knee joint, better results were noted in group B (82.1% excellent and good results) than in Group A (69.8% excellent and good results). Moreover, it was noted that those patients who couldn't relax even after detailed instructions in the physiotherapy clinic are ~the ones who did not have better results with only relaxation exercises. Although we have not used this as a strict criteria, these patients are better treated with relaxation and resisted exercises. Also, in general, patients with little osteoarthritic changes early osteoarthrosis) responded to relaxation exercises alone whereas late osteoarthritic cases needed relaxation and resisted exercises for symptomatic improvement. Although there is some difference between male and female patients (better results in female both the groups) (Table 5) this is not statistically significant. Moreover there were more number of female patients.

Many of these patients with osteoarthrosis of the knee joint have quadriceps

Table 4 : Group-wise Analysis of the Results

S.No.	Result Grade	Group-A Relaxation Exercises Only		Group-B Relaxation & Resisted Exercises	
		No. Of Patients	Percentage	No. Of Patients	Percentage
1.	EXCELLENT	34	39.5%	15	64.4%
2.	GOOD	26	30.3%	8	17.7%
3.	FAIR	13	15.1%	7	15.5%
4.	POOR	13	15.1%	1	2.4%

Table 5 : Sex-wise Analysis of the Results

S.No.	Result Grade	Group-A Relaxation Exercises Only		Group-B Relaxation & Resisted Exercises	
		Male	Female	Male	Female
1.	EXCELLENT	12	22	9	20
2.	GOOD	10	16	2	6
3.	FAIR	5	8	4	3
4.	POOR	7	6	0	1

Table 6 : Causes of Fair & Poor Results

S.No.	Cause	No. of Patients
1.	Duration and Severity of involvement more than 5 years.	10
2.	Did not follow instuction, so could not relax	8
3.	Over weight	12
4.	No proper follow-up	4

or hamstring muscle weakness and faulty postural and gait pattern [5,10]. They were having a tendency to keep the muscles tight due to fear of pain. Relaxation exercises have helped these people along with other forms of physiotherapy. Dynamometric measurements including isometric knee extension torque are not valid measurements to judge the outcome of treatment [5]. As direct measurement of functional performance is a more valid procedure, the objective factors evaluated by us are of this nature, especially in the context of our socio-economic circumstances.

Weight reduction [1,4], gait training including climbing and descending stairs [1,10], correct use of walking aids [1], posture correction and joint protection [1,10] compliment the exercises and thermotherapy, thus greatly helping in relieving the pain. Self care by above measures and continuing exercises at home is an important aspect of physiotherapeutic treatment, of osteoarthrosis. Continuing interest in the patient demonstrated by review at intervals ' is important [2]. Poor results in our study were chiefly due to absence of follow ups and instructions about physiotherapy not being carried out properly in addition to duration and severity of involvement (22 cases-Table 6) Failure to reduce weight is also a significant cause of failure (12 of 34 cases)

Conclusions

Exercise programme is an important part of treatment of osteoarthrosis of the knee. Proper assessment of the patient in the physiotherapy clinic, followed by relaxation or relaxation and resisted exercises complimented by other physiotherapeutic and joint protection measures are needed to provide best functional outcome. A combination of relaxation and resisted exercises gives better results than relaxation exercises alone.

Summary

One hundred and thirty one cases of osteoarthrosis of the knee joint were randomly treated with relaxation exercises (Group A) and relaxation and resisted exercises (Group B) and followed up for more than eight weeks. 69.8% of Group A and 82.1% Group B patients showed excellent to good results. Relaxation and resisted exercises together did better in late cases of osteoarthrosis and in those patients who could not relax. Weight reduction, proper understanding of instructions and follow up are also important factors in determining the outcome of the physiotherapeutic programme.

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Piriformis Syndrome

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Abstract

Piriformis syndrome is characterised by pain in the distribution of sciatic nerve, dysesthesia/hypoesthesia, positive Lasegue sign and tenderness at the sciatic notch due to entrapment of sciatic nerve as it passes beneath the piriformis muscle. A 38 years old female presented with positive AIF maneuver (adduction,internal rotation and flexion of hip) in addition to the clinical findings. CT scan for piriformis muscle also revealed hypertrophy of piriformis muscle on the side of clinical symptoms. 'H' reflex study using a standard technique was done both in normal anatomic prone position and in AIF position to identify prolonged 'H' reflex latency. However the latency of 'H' reflex was 27 milliseconds in both normal anatomic position and in AIF position. Unlike previously described cases, there was a striking reduction in amplitude of the 'H' potential without any corresponding reduction in amplitude of the 'M' potential in AIF position suggesting a conduction block at sciatic nerve. Decreased amplitude of 'H' reflex potential could be the only objective finding in electrophysiological study for Piriformis syndrome instead of prolonged 'H' reflex latency.

Introduction

Piriformis syndrome first described in the late 19th century is characterised by pain in the distribution of sciatic nerve, dysesthesia (or) hypoesthesia, positive Laseque sign, tenderness at the sciatic notch due to entrapment of one or both divisions of sciatic nerve as it passes beneath the piriformis muscle during its exit from pelvis[1-5].

The incidence of piriformis syndrome was six times more common in female than male. Most patients experience pain while walking or sitting even for a short perioc. Tenderness at the piriformis muscle can be elicited by palpation either by gluteal (or) rectal method [7].

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The symptoms are exaggerated or reproduced by the maneuver of adduction, internal rotation and flexion of the hip. In this postion the inferior border of piriformis muscle gets tightened and exerts pressure over the sciatic nerve as it passes beneath the tendinous portions of the piriformis muscle. This maneuver is described as AIF position. In Frieberg's maneuver forceful internal rotation of the extended thigh in sitting position elicits buttock pain by stretching the piriformis muscle. In Pacr's maneuver active abduction of the thigh in sitting position elicits pain due to contraction of piriformis muslc. In simpler method with the patient in lateral decubitus with painful side up,hip flexed, knee resting on the table, painful extremity is lifted holding the knee several inches off the table, to elicit contraction of the piriformis and there by pain of piriformis syndrome [8,9].

Frieberg and Vinke defined piriformis syndrome as the triad of positive Laseque sign, tenderness at the sciatic notch and improvement withconservative treatment with no other positive signs or laboratory findings. There were attempts to confirm the entrapment of the sciatic nerve at the sciatic notch by scintigraphy, evoked potential study and later by 'H' reflex latency study [9].

Fishman LM et al in their study on "Electrophysiological basis of the piriformis syndrome" used 'H' reflex as an aid for the diagnosis of Piriformis syndrome. Their study emphasized that the objective of reproducing the symptoms of piriformis syndrome by AIF maneuver i.e., the pressure exerted by the piriformis muscle over the sciatic nerve can be electrophysiologically demonstrated by the reversible reduction of conduction by 'H' reflex study. The 'H' reflex latency in anatomic prone position was compared with that of 'H' reflex latency in AIF position to prove the delay in latency by Fishman LM et at [9].

Hypertrophy of the piriformis muscle can also be demonstrated by CT and MRI [2,10].

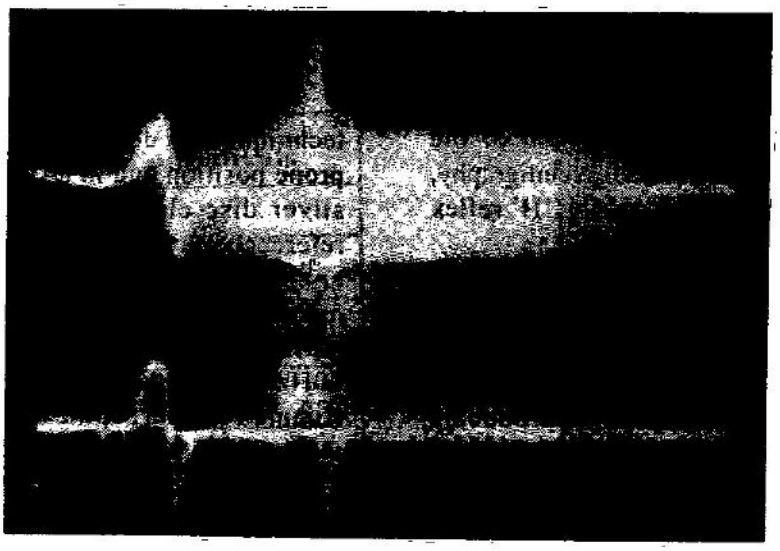
Case Report

A 38 years old female working as a clerk in a bank reported on IstFebruary 1995 with pain in the gluteal region radiating down the back of the thigh for the previous two and half years. She has marked the location of pain in the gluteal region with pen which was corresponding to sciatic notch. The pain was piercing in nature increased by automobile travel. Deep pressure over sciatic notch elicited belching. There was associated frequency of micturition during exacerbation of pain. She was treated with NSAID without any relief of pain. Clinical examination revealedpainful extension of lumbosacral spine, positive Laseague sign, tenderness over the sciatic notch. AIF maneuver reproduced the pain in the distribution of sciatic nerve. There was no neurological deficit. A clinical diagnosis of piriformis syndrome was made.

'H' reflex study using a standard technique was done both in normal anatomic prone position and in (AIF) position. Surface silver disc electrodes both, recording and reference were placed over the soleus 2.5 cms apart. The sensitivity was fixed at 500 microvolt per division and sweep speed at 10 milliseconds per division. Filters were set at 10Hz and 10,000Hz. The tibial nerve was stimulated at the popliteal fossa using a bipolar electrode with the cathode facing proximally. The 'H' reflex was elicited at submaximal stimulus and disappeared on supramaximal stimulus. The wave of 'H' reflex is triphasic with an amplitude of 8000 microvolt and duration of 10 milliseconds. The configuration of the wave of 'H' reflex resembled that of 'M' potential. The 'H' reflex study was repeated in AIF position without changing the position of the electrode. Unlike Fishman's report there was prolongation of latency i.e., the latency of 'H' reflex was 27 milliseconds in both normal anatomic position and in AIF position. However there was a striking reduction in amplitude of the 'H' potential without corresponding reduction in amplitude of the 'M' potential. The amplitude of 'H' potential was 2000 microvolt in (AIF) position in contrast to the amplitude of 8000 microvolt in normal anatomic prone position (Fig.I). It confirms the presence of conduction block during AIF position ascertaining the diagnosis of Piriformis syndrome.

Evaluation of motor conduction velocity of sciatic nerve at the level of thigh, lateral popliteal nerve and tibial nerve revealed normal conduction. EMG of extensor digitorum

Figure. 1



Upper trace: left to right (1) stimulus artifact, (2) 'M' potential, (3) 'H' potential with normal amplitude

Lower trace: left to right (1) Stimulus artifact, (2) 'M' potential, (3) 'H' potential with reduced amplitude

Figure. 2

Hypertrophy of the piriformis muscle on the right side

brevis showed marginal reduction in recruitment without any evidence of neurogenic potentials. EMG of soieus muscle also showed normal motor unit potential with normal recruitment. Correlation of EMG and nerve conduction study with 'H' reflex only emphasizes functional conduction block during entrapment of sciatic nerve in AIF position.

CT scan for lumbosacral spine showed hypertrophy of piriformis muscle on the right side consistent with clinical symptoms (Fig.2)

Discussion

The earliest concept that "Piriformis syndrome is not always accompanied by positive laboratory finding" is no longer true. The entrapment of sciatrc nerve can be objectively demonstrated[1] electrophysiologically by delay in latency of 'H' potential [2] hypertrophy of piriformis muscle by CT and /(or) MRI.

We have reported a case of piriformis syndrome characterised by sciatic pain, tenderness at sciatic notch, positive AIF maneuver and hypertrophy of piriformis muscle in CT evaluation and reduction in amplitude of 'H' potential in AIF position.

Unlike previously reported cases, the only electrophysiological objective finding was diminished 'H' reflex amplitude. It only emphasizes that reduction in amplitude of the 'H' potential also constitute one of the electrophysiological parameters to diagnose entrapment of sciatic nerve in piriformis syndrome.

CT evaluation of piriformis muscle also becomes mandatory in addition to electrophysiological study in every case of sciatica.

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Post-Streptococcal Reactive Arthritis, A Case Report

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Abstract

Post - streptococcal reactive arthritis, a Case Report (9 year follow up) and review of the literature.

A 38 year old male patient; was seen in out-Patient Department during August'88 with PIP arthritis of left middle finger which progressed later asymmetrical poly-arthritis. Subsequently it was diagnosed as a case of post infective (streptococcal) polyarthritis and treated appropriately with good result. Post infective poly arthritis is a common cause of rheumatism and often was not entertained in differential diagnosis.

Case Report

A 38 years old man was seen as an out patient in August'88 with "spindling" of left middle finger. He was provisionally diagnosed as a case of tuberculous dactylitis and given a course of anti-tuberculous therapy. After completion of the course, he developed PIP arthritis of left index finger with arthritis of left sternoclavicular joints both wrists and both ankles. No other systemic manifestation was found. Past history was scrutinzed and found that he had scrotal swelling with recurrent fever for which he was was operated in '77. Blood investigations showed :

Haemoglobin	- 11.7 gms
TC	- 6100
Polymorphs	- 60
Lymphocytes	- 32
Eosinophils	- 8
ESR	- 3mm per hour
ASO Titre	- 400 IU

and RA factor, CRP were within normal limits.

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He had a course of antibiotics (Procaine Pencillin) which completely relieved him from symptoms for about 5 years. Again in '95, he reported to our Out -Patient Department with asymmetrical PIP joint involvement of both hands and right wrist. Joint No other system was involved. Routine blood examination showed a mild rise in ESR (26 mm/hour)and RA factor as well as, ASO Titre were within normal limits while CRP was elevated (2.4 mg% - Our lab value less than 0.6 mg%) and HLA B27 was negative. His asymmetric poly arthritis is not fitting into ARA criteria for rheumatoid arthritis as well as presence of previous infective focus was more in favour of post-infective poly arthritis (recurrence) He is again put on a course of antibiotics (procaine pencillin) NSAID's with total disappearance of symptoms within a week and continue to be asymptomatic as on week of June 97.

Discussion

Post streptococcal reactive arthritis is diagnosed in patients with group A Beta Haemolytic streptococcal infection and predominant articular involvement in adults.

History of preceeding infection like sore throat, lymphangitis etc., is usually elicited in most cases of post streptococcal reactive arthritis.

The clinical manifestation of post streptococcal reactive arthritis constitute a spectrum that ranges from an isolated transient monoarthritis to 3 more severe multisystem disease. It can mimic soft tissue rheumatism, monoarticular arthritis, symmetrical polyarthritis, asymmetrical poly/pauciarthritis and spondylogenic arthritis. 'Dactylitis or Sausage Digit' a diffuse swelling of a solitary finger (or) toe is a distinctive feature of reactive arthritis. Other system involvement like cariditis glomerulonephritis, vasculitis are reported even in adults. So these patients must be checked and investigated if necessary for multisystem involvement and followed up periodically.

Presence of ASO Titre confirms the diagnosis but its abcence does not exclude PSRE. Streptococcal cell wall antigens are implicated in articular involvement. Immune chemical analysis and immune electrophoresis of serum/synovial fluid is more useful in detection of antigen/antigen-antibody complex. Although, typing for B27 is not needed to secure the diagnosis in clear cut cases, it has prognostic significance.

Previously the prevailing dogma held antibiotics were of no benefit in reactive arthritis. Now it is found, appropriatecourse of antibiotics may control or ameliorate the disease. In few cases, refractory to this simple treatment may require immunosuppresive agents such as azathioprine, methotrexate and sulfasalazine.

Conclusion

Chronic and recurrent form of arthritis may occur with post streptococcal infection. Post infective reactive arthritis due to many organisms may present with various rheumatic complaints. It is worth - to search (or) presume the incriminating microbe and institute appropriate therapy which may abolish (or) retard the severity of the disease.

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A Three Piece Plastic Tenodesis Splint For Quadriplegic Patient

Dr. Arvind Kumar Gupta, Dr. Geeta Devi Purohit,

Abstract

Cervical spine injuries at C6 level results in tenodesis hand. In these hands the grasp is very poor so patients are unable to perform various A.D.L. activities. But when, three piece plastic tenodesis splint is applied it provides power to the thumb finger prehension and helps the patient to carry out various A.D.L. activities.This paper describes the results of 12 such splints fitted to quadriplegic patients in Rehabilitation Research Centre, Jaipur. A proportion of tetrapiegic patients found such splints helpful in carrying out various A.D.L. activities.

Introduction

Injuries to the cervical region with spinal cord damage and consequent Tetraplegia are a not infrequent cause of chronic disability in young people. With efficient initial management many survive and have a reasonable life expectancy. Such people have a varying degree of upper limb involvement depending upon the level and completeness of the lesion. Their residual function ranges from very high lesion with limited shoulder movement only to lower cervical lesions where only intrinsic hand function is impaired. In order to carry out the basic function of eating, toilet and communication, and simple additional functions such as writing, washing and shaving, it is necessary to have some sort of prehension and movement of elbow.

In spinal cord lesion at C6 level, shoulder and elbow motions are stronger, and there is more co-ordinated extremity positioning, but active elbow extension is absent. The important wrist extensors are spared, permitting a tenodesis hand. Early use of appropriate splints benefits the quadriplegic patient in providing muscle exercise, mechanical function for purposeful activity and the assurance that the patient is capable of accomplishing tasks.

In tenodesis hand grasp is achieved through an active wrist extension-passive finger flexion pattern. Although the patient may be able to effect this function voluntarily with efficient wrist extension without splint but the grip sufficient for strong grasp and fine prehension may be lacking in thumb finger prehension. The splint is applied to give power for functional needs of prehension (See Fig. 2). These tenodesis hands can be maximally developed, through carefully supervised exercise and splinting programme.

A Three Piece Plastic Tenodesis Splint :

The tenodesis splint uses the natural function of finger flexor tendons to tighten in wrist hyper extension and to relax in wrist flexion. It works on flexor hinge hand principle. This principle permits only metacarpophalyngeal motion, stabilises the interphalyngeal joints of digits 2nd and 3rd and both the interphalyngeal and metacarpophalyngeal joints of thumb, creates a three jaw chuck prehension between thumb and the index and middle finger. It allows hinge movement at the etacarpophalyngeal joints of these two fingers. The thumb is stabilised in a position of Palmar abduction. The index and middle fingers are held together in a finger case

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which allows movements at the MCP joints but no movement at IP joints. The two fingers move in flexion to meet the fixed thumb.

The splint consist of three parts (See Fig. 1)

1. A one piece moulded dorsal cover for the three phalanges, each of the 2nd and 3rd digits which is adjustably attached by a cord to a wrist cuff.
2. A hand orthosis with a thumb post which holds the thumb in a stable position.
3. Wrist cuff.

Prerequisite :

1. There should be active wrist extension.
2. Good free range of movement at M.C.P. joints of index and middle fingers and a wide supple thumb web.
3. Active pronation also need to be as full as possible.
4. Elbow flexion should be present.
5. There should be no spasticity or spasticity should be minimum.
6. Training in use of splint should be intensive.

Rehabilitation

The splints are usually fitted as part of the initial hospitalisation and subsequent rehabilitation programme. Acceptance and continual use appear to be related to many factors. The design of splint, its efficiency and reliability, the amount of training and indoctrination in splint usage; motivation" and the ultimate resettlement of the patient, are important factors.

Material and Methods

Between the year 1991 and 1995 12 tetraplegic patients were fitted with tenodesis splint which was made of polypropylele sheet (alkathene granules) after taking the initial mould, in Research & Rehabilitation Centre, Jaipur and training was given to them in various A.D.L. activities.

Results

The age of patient at the time of fitting splint is given in Table No. 1.

Table-1

Age of patient at the time of fitting splint

0-19 Yrs	20-29	30 +	Total
-	4	8	12

The level of lesion of quadriplegic patient using tenodesis splints are shown in Table No. 2 and activities for which tenodesis splin is used by tetraplegic patients are shown in Table No. 3.

Table-2

Use of tenodesis splint by patient with tetraplegia

Level of S.C.I. patient	No. of patients
C6	6
C6/7	4
C7	2
Total	**12**

Discussion

The tendoesis splint has a functional value for a proportion of patient with tetrapiegia. The tenodesis splint is simpler, lighter less expensive and less bulky. Its patient acceptance is good. In our series most of the patient used their splints for grooming, feeding and writing activities. No patient used the splint for work.

Table-3

Activities for which tenodesis splint is most used by tetraplegic patients

Patient activities	No. of patients
Job	-
Study	1
Hobbies	1
Writing	12
Feeding	12
Grooming	12

Fig. 2a Patient with Splint

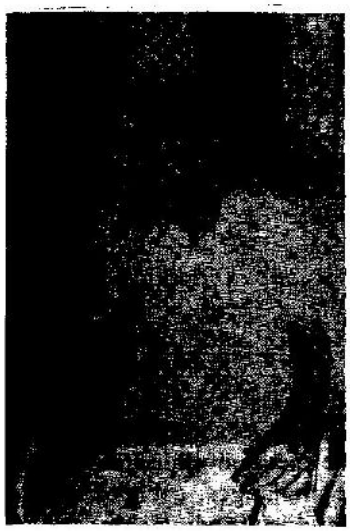

Fig. 2b Patient with Splint

Conclusion

This paper is in part an appeal for the inclusion of tenodesis splint in lower cervical lesion tetraplegics rehabilitation routinely, when they achieve active dorsiflexion of wrist so that they can be made more independent in their ADL activities.

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The Role of Polypropylene Floor Reaction-Orthosis in Post Polio Patients with Quadriceps Weakness

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Abstract

A Study of 25 cases having post polio unilateral quadriceps weakness, who were given polypropylene floor-reaction orthosis is presented here. Age of patients ranged from 2-25 years. Cases with bilateral quadriceps weakness or a completely flail limb were excluded. The patients were graded by criteria based on gait characteristics and their functional activities. Mean follow up period was 11.4 months. Rejection rate of orthosis was only 4%. Complications were minor. The author concludes that polypropylene FRO has a definite role in patients with post polio quadriceps weakness. It is quite cheap and acceptable to patients.

Introduction

Poliomyelitis is the most important cause of physical disability in India. About 2,00,000 cases of paralytic polio occur here annually. The disability is mainly due to involvement of lower limb muscles of which the most challenging situation is posed by quadriceps paralysis; with this there is a constant fear of fall because of an unstable knee. Many patients stabilise such a knee by walking with their hands on thigh which certainly is not only an awkward way of walking but also restricts the activities of the patient who is converted from a quadripod to a tripod.

Usual solution to this problem has of long been to brace the patient with long metallic calipers which are heavy, cumbersome and energy consuming devices. Moreover they lock the knee producing an unphysiological and ungainly manner of walking. Though some people do perform a hamstring muscle of walking. Though some people do perform a hamstring muscle transfer also for this condition but that has not produced much convincing results.

Saltiel J. in 1969 first gave the idea of an orthosis made of reinforced laminated platic which could stabilise such a knee without locking it by producing an artificial equinus at ankle. Later Lethneis (1972) and Rubin and Danisi (1975) suggested some modifications in the saltiel design.

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Principle of Floor-Reaction Orthosis (FRO)

At heel strike the weight line of body passes posterior to knee joint which in a patient with weak quadriceps would cause the buckling of knee. By producing an equinus thus ensuring an initial forefoot contact the weight line is shifted anterior to knee and stabilises it. It is called an FRO because in this the floor reaction from below is utilised via the lateral uprights to press the knee in posterior direction.

We have worked on FRO made of polypropylene (PP) which is not only light thermoplastic material but also is quite resilient and tough.

Material and Methods

25 patients irrespective of age and sex having quadriceps weakness were given FROs at Orthopaedic workshop, MCH, Rohtak. Cases

with completely flail limb, bilateral quadriceps paralysis were not taken up for the study.

Fabrication of FRO

This involves the following steps :

1. **Preparation of negative mould:** This is done by wrapping POP bandages over the stockinette covered involved leg from toes to patella. Pressure sensitive points are marked on the stockinette. Foot is held in 10-15 plantar flexion.

2. **Preparation of positive mould :** The negative mould taken off the leg is filled with POP powder with an iron mandrel put in the centre. This produces a positive mould whose surface is made as smooth as possible.

3. **Thermoforming Polypropylene :** 3-5 mm PP sheets (depending upon the requirement) are heated in an oven at 180-1900 for 15 minutes. The patellar part and leg part are separately heated. These are applied on the positive mould and well moulded. No sharp corners are allowed.

4. **Finalising FRO :** The two parts are riveted together and velcro and leather straps attached and hence an FRO is formed.

Ours is basically a PTB design but with recontouring of the patellar piece so that it is much shallower and uses maximum area as advised by Dr. P.K. Sethi (1992). Grading of patients was done as shown :

Grade I

a) Gait characteristics : Patient walks with
   i) Hand on thigh
   ii) Circumduction of limb
   iii) External or internal rotation of limb
   iv) Forward bending of trunk

b) Activities : Patient requires an external aid e.g. crutch or stick for walking

Grade II

a) Gait characteristics : Patient walks
   i) Without hand on thigh
   ii) Without circumduction of limb
   iii) Without external or internal rotation of limb
   iv) With slight forward bending of trunk

b) Activities
   i) Patient does not use any external aid
   ii) Patient can walk on even surfaces only and cannot negotiate slopes or uneven surfaces.
   iii) Patient cannot run without falling

Grade III

a) Gait characteristics : Patient walks without
   i) Hand on thigh
   iii) circumduction of limb
   iii) external or internal rotation of limb
   iv) forward bending of trunk

b) Activities :
   i) Patient does not use any external aid
   ii) Patient can walk on uneven surfaces and can negotiate slopes
   iii) Patient can run without falling Results were termed excellent, good or poor on any improvement No improvement of grade.

Observations

Of 25 patients 13 (52%) were males and 12 being females. Age varied from 2 years to 25 years, mean age being 12.4 years. 15 cases (60%) were old i.e. they had previously used the KAFO while 40% were fresh cases 22 cases (88%) had one or other associated deformity at knee, ankle or foot (Table I). Equinus was the most Common

associated deformity. 22 cases (88%) had shortening of the affected limb ranging from 0.5 cm to 3 cm. All but one case were followed up for more than 6 months. Maximum follow-up was of 18 months in 4 patients. 24 cases (96%) could sit cross legged and squat and they did not report any pain in the patellar area. No patient developed any reaction to PP. At 2 weeks of follow up, results were excellent in 13 cases (52%) and good in 11 cases (44%). Only 1 case (4%) had poor result. At 6 months of follow up 4 patients having good result further improved to excellent thus making the final results excellent in 68% good in 28% and poor in 4% (Table II). Cost factors were taken into account and the cost ranged from Rs. 195 to 330 according the FRO. The weight of orthosis ranged from 250 g to 500 g. No orthosis broke before 6 months. Only 4 cases (16%) broke their orthosis during follow up of which 3 were heavy weight adults. Maximum breakage was at ankle.

Table I

Associated Deformities at Knee /Ankle /Foot

Sr. No.	Type of Deformity	No. of Patients	Percentage
1.	Mild knee flexion <10.	5	20%
2.	Equinus	9	36%
3.	Cavus	4	16%
4.	Cavo-varus	2	8%
5.	Cavo-valgus	2	8%
6.	No deformity	3	12%
	Total	25	100%

Table II

Results of Patients after Fitting of FRO

Pre FRO Grade	Post FRO Grade	Results	No. of pts. at 2 weeks	%age	No. of pts. at 6mths.	%age
I	III	Excellent	9	36%	9	36%
II	III	Excellent	4	16%	8	32%
I	II	Good	11	44%	7	28%
I or II	No change	Poor	1	4%	1	4%
	Total		25	100%	25	100%

acceptable as any ordinary shoe can be worn over it and clothes can completely conceal it. Though the series presented is quite small, but the results are convincing and the design needs to be tried on a large scale.

Discussion

Age is no bar for an FRO as the minimum age in the study was 2 years and maximum 25 years. 60% cases had previously used a KAFO of which only 1 patient (4%) who had poor result did not accept the design while all others readily discarded KAFOs. It was seen that mild deformities at knee, ankle and foot are no contra-indication for FRO as PP being thermoplastic can be easily moulded to accomodate these. Equinus was the most common deformity found and it is rather beneficial because we produce the same by an FRO. It is known that a poliotic limb is usually shorter than the normal side. In our study shortening upto 3 cm was well compensated by FRO as the equinus induced by FRO increases the limb length. It is rather beneficial for the affected limb to be slightly shorter otherwise the shoe on normal side wears out early.

Only one patient in our study had poor results with FRO and had to be given a KAFO. Reassurance to the patient thereby developing his confidence does affect the results as shown by improvement of grade of 4 cases from good to excellent at 6 months. These cases had previously been using KAFO which though locks the knee undoubtedly provides a stable limb. They were unsure of stability an FRO could provide. But or repeated assurances and practice by themselves improved their results. Squatting and sitting cross legged forms an integral part of our life-style especially in villages. An FRO does not make these impossible thus taking care of our social needs. Pain in the patellar are was a major problem with Saltiel design. In our study no patient who had accepted an FRO developed this complication emphasising the significance of differentiating pressure sensitive and pressure tolerant areas of knee and distributing the force over a larger surface area. Though plastics can cause skin reactions, no patient in our series reported this complication, though some patients did camplain of excessive sweating in the limb wearing PP FRO which definitely is a problem with PP as it blocks the ventilation of part covered by it. PP is a fgairly resilient material as is evident from the fact that no FRO broke before 6 months and total breakage during the follow up period of around 1 yr. was 4 cases (16%) of which 3 patients were heavy weight adults. In such patients stronger materials may be used like reinforced polypropylene in which glass fibre is sandwiched between two polypropylene sheets to provide extra strength or a Carlson fibre orthosis may be used. Maximum break points were at ankle area (12%) which should be made stronger because it bears maximum stress; for this raising corrugations in PP is a useful method.

The orthosis is quite light (250 g to 500 g) as compared to a conventional caliper (about 2000g), this reduces the energy consumption considerably and increases the activities of patient by increasing his fatigue period.

Cost is a very important factor for applicability of any new design as ours is a poor country and many patients are leading a treacherous life for want of funds. An FRO is quite cheap (Rs. 195 to Rs. 330) as compared to a KAFO made from Alimco components (around 1100 Rs.).design.

The present design could be fabricated in about 3 hours which is quite less and the patient can be given the orthosis even on the same day he reports to us thus minimizing his visits and expenditure.

To conclude the present design of polypropylene has a definite role in the rehabilitation of patients with post polio quadriceps weakness. It not only provides a

physiologic gait by keeping the knee free but is cheap, light weight and strong. The fabrication is not a difficult procedure and no sophisticated appliances are required for it. It is cosmetically acceptable as any ordinary shoe can be worn over it and clothes can completely conceal it. Though the series presented is quite small, but the results are convincing and the design needs to be tried on a large scale.

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Early Mobilisation of Geriatric Intertrochanteric Fracture With External Fixator

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Abstract

This clinical study is based on 125 consecutive patients of more than 59 years of age, with fresh stable intertrohanteric fracture. All these patients were residents of the catchment area of New Delhi, primarily treated in Orthopaedics Department of Deen Dayal Upadhay Hospital, New Delhi from January 1989 to December 1992. These patients were managed by performing close reduction of fracture table and fixing the fracture by an external fixator. Early operation with immediate weight bearing after fixation was the usual procedure adopted. Each patient was scheduled to mobilization in the department of orthopaedic and rehabiliation as an out patient or at home. The follow-up ranged from 6 months to 2 years. The results are encouraging with few minor complications.

Indroduction

Inter-trochanteric fracture of the femur is the most common injury of geriatric age group. A reasonable return of function following this fracture in elderely patient can only be achieved by early, definitive stabilization of the injured extermity and rapid mobilisation, Conversely, prolonged immobilization of the patient through the use of conservative fracture management which places the patient at risk of pulmonary decompensation, venombolic disease, decubitus ulcer formation and further generalised musculo-skeletal deterioration from which recovery becomes unlikely. In recent years the treatment of inter-trochanteric fracture has improved considerably as result of advancement in design of internal fixation devices and understanding of the biology and mechanics of fracture healing in osteoporotic bone. Although open reduction and internal fixation has reduced the mortality and morbidity associated with this fracture, but because of many concurrent illnesses present at this age group this mode of treatment is not always possible. So an ideal surgical procedure should be simple to minimize operation time and blood loss. We are presenting our results of managing this fracture by a simple technique of external fixation and early mobilisation thereafter. This procedure is done under local anaesthesia and does not require complex instruments or implants. Our aim is to mobilize these patient in the hospital as early as possible and rehabilitate them in their pre-fracture habitat i.e. at home. The patients may face few problems at home, but at the same time they gain emotionally in the process of becoming indepedent and gaining self confidence.

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Material & Methods

All the 125 cases taken for the study were throughly examined and necessary laboratory investigations were done to assess their renal, cardiac & metabolic status. The patients were divided into following three groups according to their medical history and physical status on admission. Group-A included patients with no known diseases other than the fracture hip. Group B included patients who had additional diseases

not likely to impede rehabilitation. Group-C included patients with additional diseases or impairments which would probably affect rehabilitation. All these patients were sucjected to the following operative procedure and mobilisation programme.

Operative Technique

As soon as patient's general condition is found to be stable, he is taken to operation theatre. Just before operation some sedative and pain killer is given to decrease apprehension and pain. Patient is then placed supine on the fracture table. Fracture is reduced by gentle traction and abduction in moderate external rotation followed by gentle internal rotation. Reduction is checked by antero-posterior and lateral roentgenograms or by the image intensifier. Once reduction is acceptable two or three 4.5 mm diameter schanz pins are passed in the neck portion and two or three 4.5 mm diameter cortical threaded pins in the shaft fragment. The clamps and rod of AO's Tubular design are attached to these pins.

Final X-Ray film is taken and minor adjustment can be done at this time.

Mobilization and Rehabilitation Schedule

On the very first day the patient is assisted in sitting and turning. Chest physiotherpy and quadriceps drill is started simultaneously. In next few days knee bending and quadricep building exercises are started, patient is encouraged to stand. Once patient is confident to stand he is assisted in walking with the help of quatraped. A team of Nursing Staff, Physiotherapist and Occupational therapist helps the patients in re-establishing ambulation and normal activities of living such as dressing, toileting and personal hygiene. The importance of doing as much as possible for themselves is emphasized to both patient and their relatives. The ability to perform such basic functions as early walking with an aid and managing personal hygiene are taken as good prognostic indicators for rehabilitation later.

Observations & Results

In our series of 125 patient the age ranged from 50 years to 95 years with the mean age of 68 years. Out of these 72 were males and 53 females. (Table-I). On the basis of history, examination and laboratory investigation they were divided among three diagnostic groups ranging from A for normal to C for severely diseased. At the time of admission there were 27 patients in Group A, 56 in Group B and 42 in Group C. There were total 19 deaths in our series, out of which 4 were during the hospital stay. (Table-II). The causes of death were Cardio-Vascular disease in 12 patients, stroke in 2, pneumonia in 3 and cause of death could not be known in 2 cases. Age and general medical condition were very important factors in rehabilitation. The range of movement attained in Group A and B patients and those less than 80 years of age was almost 80% at 4 months as compared to 60% in others. At 2 weeks post-surgery 100 patients were able to walk with the help of quadraped and at 4 months 112 could walk with or without support (Table-III). Similarly at the time of discharge 89 patients managed dressing up and personal hygiene. The number increased to 101 at 4 months and 103 at 12 months. Some of the more demanding activities like sitting cross legged and squatting during the first 4 months were difficult but few of our patients could manage these activities. The complications observed by us are shown in table V. There is a high incidence of superficial pin tract infection and knee stiffness, However with the aid of proper dressing and physiotherapy the effect of this on the final result is insignificant.

Table I
Age and Sex Distribution

Age	Male	Female	Total
50-64 Years	19	21	40
65-79 Years	42	26	68
More than 80 Years	11	6	17
Total	72	53	125

Table II
General Medical Condition and Mortality Observed in our Series.

General Medical Condition	No. of Patients on Admission	No. of pts. at time of discharge	No. of death before discharge	Total No. fo death 4 month	Total No. of death 4 months.
A	27	27	0	1	1
B	56	55	1	2	6
C	42	39	3	5	12
Total	125	121	4	8	19

Table III
Ability to walk Quatraped or Better.

Ability to walk	At 2 weeks post surgery	At the time of discharge	After 4 months	After12 months
Yes	100	115	112	104
No	21	6	5	2

Table IV
Ability to Manage normal Activities of Daily Living (ADL)

Ability to manage ADL	At 2 weeks Post Surgery	At time of Discharge	After 4 months	After 12 months
Yes	84	89	101	103
No	37	32	16	3

Table V
Complications Observed in our Series

Complications	No. of patients	Percentage
1. Inability to achieve reduction	2	1.6%
2. Superficial pin Tract infection	22	17.6%
3. Deep infection & OM	2	1.6%
4. Unacceptable loss of reduction	3	1.4%
5. Aseptic pin lossening and migration	12	9.6%
6. Quadricepadhesion and Knee stiffness	80	64.0%
7. Hip stiffness	10	8.0%
8. Implant failure	0	0

Discussions

Elderly patients are best served by rapid definitive fracture care aimed at early restoration of mobility and function. In most cases these patients are healthiest on the day of injury and are in best operative condition for Surgery at that time. Nevertheless, many concurrent illnesses are often present which make a major surgical procedure very risky or impossible. So, a simple surgical procedure which will put minimal physiological stress upon these patients, is desirable, keeping this goal in mind, we have managed 125 patients of Inter-trochanteric fracture, having a mean age of 68 years. After stabilising the fracture with an external fixator a programme for early mobilization in the hospital and rehabilitation at home was developed in co-operation with the physiotherapy Deptt. Most of these patients (66.4%) were suffering from some concurrent illness at the time of admission, Our mortality of 16% at one year is comparable with the best results reported for open reduction and internal fixation. About 96% of the patients returned home directly after post-operation mobilization period of usually 2-3 weeks in the hospital. (fig. II) At four month 89% of the patients were able to walk with or without the help of some aid. 80% of the patients were able to do normal activities of daily living. At one year all except one out of hundred six alive patients,

were ambulatory and 82 were able to do house hold activities. So 80% of our patients regained near pre-fracture functional status at four month after the fracture. Inspite of high percentage of early complication like pintract infection and knee stiffness the overall result is highly satisfactory.

This study highlights the advantages of adopting a simple operative technique and importance of an early mobilization and rehabilitation by close co-operation between the orthopaedic surgeion, the physiotherapist, the patient and his or her relative. By this means, a continuity of care and early permanent independence can be achieved for elderly hip-fracture patients and institutionalised rahabilitation can be reduced with benefit for both the patient and society.

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Jaipur Syme's Prosthesis
A Prosthesis for Ankle-foot Amputees

Dr. Surendra Abusaria, Dr. S.C. Kasliwal

Abstract :

A Study of 'Jaipur Syme's Prothesis' has been undertaken to evolve the relative merits of this type of prosthesis, in comparisen to other types of Syme's Prostheses, in management of Ankle Foot amputations. This study included 68 Syme's and other related types of amputees who had used the prostheses for more than 6 months. Fortynine amputees, wearing the prothesis without any major break points, were objectively evaluated to assess their abilities in activities of daily living. The functional out come was satisfactory in most of the amputees. these findings have suggested that the prostheses tailored for individual subjects would provide considerable benefits to Ankle-Foot Amputees.

Key Words : Ankle-Foot amputations, Jaipur Syme's Prothesis Stump conditions, Activities of daily living (A.D.L.)

Introduction

Until 1969 a Canadian type of Syme's Prosthesis[2] with a SACH-FOOT was avaliable in India and was highly unsuitable for Indian amputees. These protheses were rejected by a large number of Indian ampuutees who reverted back to their "Elephant Shoes"[9]. After analysing special requirements of Indian Syme's type amputees the "Jaipur Syme's Prosthesis" was devloped by Prof. P.K. Sethi[5-7]. This prosthesis can be used for all types of amputations of ankle and foot[1].

Material and Methods

In the present study the first 60 amputees who were fitted with "Jaipur Syme's Prosthesis" and reported to the Rehabilitation Research Centre of SMS Hospital, Jaipur after May First 1986 have been included in the present study. In this study only those cases who had used the prosthesis for atleast six months and the patients with Syme's amputation ankle disarticulation, Chopart's amputation and Lisfranc's amputations have been included.

The amputees have been questioned in detail about their experiences with present design of prosthesis, their subjective comparitive feelings about their prosthesis, if they used any, and impact of the present design on their activities of daily living (ADL). An objective examination of amputees wearing the "Jaipur Syme's Prosthesis"which were without any major break points (so that it does not interfere with the gait of amputees) was made to know the abilities of squatting, sitting crosslegged walking over plain surface, over rough terrain over inclined surface, to stand over ampuated leg and ability of jumping. The last two acivities were examined to know ability of weight bearing and ability of shock absorption. The activities were graded as following :-

(1) Good - Patient can perform the activity with ease.
(2) Fair - Patients can perform the activity with some discomfort or difficulty.
(3) Poor - Patient can not perform the activity.

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Results

In this study we found ratio of rural and urban amputees to be equal. The number of male amputees (87%) was higher than the female (13%). The maximum number of amputees were between 20 to 30 years of age. The youngest patient in this study was of age 7 years old and the eldest was 60 years old. There is no age bar for fitting of this prosthesis.

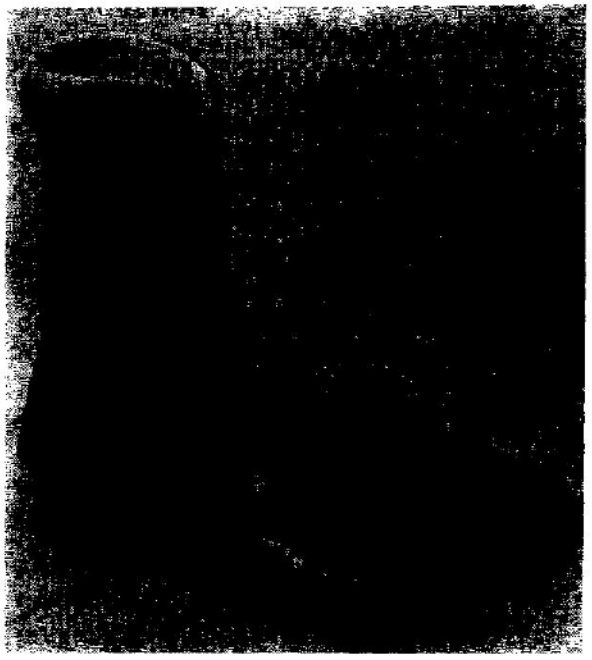
The design of prosthesis can be modified to suit individual needs of user. The majority of amputees (30%) had stump circumference of 20-25 cms. and maximum circumference was 35 cms. To solve the problem of donning and doffing of the prosthesis to a broad stump, an anterior slit is provided in the socket of prosthesis and if required, a posterior slit can also be provided with the anterior slit. This allows a comfortable insertion of broad stump. A large number of had inadequate, tender, wobbly and displaced heel pads. Eighteen percent of the prosthesis were modified by providing microcellular rubber (MCR) lining for tenderness at the end of stump. Ten percent amputees who had wobbly and displaced heel pads, were provided with the prosthesis fitted with side bars. The remaining 62% of the prosthesis were not altered.

Only nine amputees of this study had used a prosthesis other than "Jaipur Syme's Prosthesis" before opting for the percent design. All of them were not satisfied with the cosmetic appearence of other designs. The other major causes of dissatisfaction with these designs were their heavy weight (89%), unstability (56%), pain(56%), burning sensation while walking (45%) difficulty in donning and doffing of the prosthesis. 64% of amputees under this study had opted for Jaipur Syme's Prosthesis more than once. One amputee had been using this type of prosthesis for 11 years.

TABLE NO.-1

S.No.	Activities	No of amputees Good (%) Fair (%)	Poor %	Total
1.	Squatting	40 (81.6) 5 (10.2)	4 (8.2)	49
2.	Sitting Cross Legged.	42 (85.7) 4 (8.2)	3 (6.1)	49
3.	Standing on affected Limb	13 (26.5) 15 (30.6)	21 (42.9)	49
4.	Ability to Jump	28 (57.1) 9 (18.4)	12 (24.5)	49
5.	Walking on Plane	36 (73.5) 12 (24.5)	1 (2.0)	49
6.	Walking on rough terrain.	24 (49) 17 (34.7)	8 (16.3)	49
7.	Walking on inclined Surface	36 (73.5) 12 (24.5)	1(2)	49
8.	Going up and down stairs.	37 (75.5) 11(22.5)	1 (2)	49

The 49 amputees were evaluated objectively to know their functional ability with the prosthesis 92% and 94 % amputees respectively achived satisfactory level of squatting and sitting cross legged. We observed that 98% of amputees could walk over plane and rough terrain inspite of bad stumps (48%) 43% amputees could not stand over affected limb though they could perform jumping activities (76%). Since the remaining 11 amputees were having prosthesis with major break points, they were not included for objective examination (Table 1).



Discussion

Sethi P.K. etal[7,8] started work in direction of designing of a new prosthesis foot in 1969 to meet needs of Indian amputees and devloped "Jaipur Foot"[6,8] This is a vulcanised rubber foot. The "Jaipur Syme's Prosthesis" is a extension of the work done for "Jaipur Foot". The entire Syme's prosthesis resembles a "Gym Shoe" (Fig. 1). The prosthesis was modified under the guidance of Prof. Sethi and the present design came into existance since the year 1980. This design can be fitted to Syme's amputees as well as to the patients with other related type amputations of foot and ankle as mentioned earlier. This prosthesis has good properties of strength, resillience and wear resistance of water and chemicals. Till 1996, more than 3000 prosthesis have been fitted, which goes to prove that this prosthesis is well accepted.

The prosthesis can be fitted to the amputees of any age, sex and stump circumference. This design of Jaipur Syme's prosthesis is also versatile that it can be modified to suit the needs of the user. Since the prosthesis can be constructed as "Gym Shoe", the prosthesis has solved the problem of donning and doffing. This prosthesis can be fitted to bad stumps also with a little modification for example, for the stumps tender at their end and inadequate heel paid are provided with MCR pads in the socket of the prosthesis. Similarly for the stumps with wobbly heel pads the prosthesis is modified by providing lateral steel-bar to provide stability to stump.

Nine patients in this study had used prosthesis other than "Jaipur Syme's Prosthesis" before opting for the present design. The foremost cause of dissatisfaction with other designs was its heavy weight ; Others being sense of unstability, burning sensation while walking and difficulty in donning and doffing. The average weight of the prosthesis in this study is 900gms. This weight is quite physiological and patients with unilateral ampuation hardly feel any difference between the two extermities while walking. The other designs could not satisfy the amputees for their cosmetic values. Therefore these amputees rejected the other designs and adopted the "Jaipur Syme's Prosthesis". The majority of amputees (64%) opted for this design more than once.

In our country the working surface is floor and the postures of squatting and cross legged

sitting are very common. We assessed the prosthesis by objective evaluation while it was in use for its functional utility. More than 90% amputees could acheive satisfactory level of squatting, sitting cross-ledged, walking over plane and inclined surfaces. They could negotiate the stairs satisfactorily also. About 84% patients could qualify and objective examination over rough terrain inspite of bad stump conditions. This prosthesis helped these amputees a lot as in our country the amputees have to walk over terrain especially in rural areas where the roads are still unpaved. A large number of amputees could not stand over affected limbs, though they could perform activity of jumping, probably due to lack of practice. The patients with poor ability of shock absorption (Jumping activity) were examined again and it was found that the stumps were with inadequate heel pads i/e. the stumps were not ideal for weight bearing.

Conclusions

This prosthesis appears most suitable for Syme's and related types of amputees in which weight bearing surface of hind foot is not sacrificed. This design does not require any gait training and suspensory system for prosthesis. The Jaipur Syme's Prosthesis is so functional that amputees hardly feel any handicap due to loss of limb.

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IJPMR 8-9, April 1997-98 *Short Paper*

Comparative Clinical Study of Indigenous Drug with Ibuprofen in Patients of Osteoarthritis

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Abstract

Clinical efficacy of an indigenous drug and Ibuprofenin eighty patients of osteoarthrities was studied. In both the groups of 40 patients each, the results showed that the mean pain intensity scores significantly lowered down at 2 weeks and 6 weeks time interval, compared to the pain at the initiation of therapy. Between the two groups, there was no statistically significant difference in their efficacy for reduction of pain. None of the patients in either group reported any side effects with medication.

Introduction

Osteoarthritis is also called osteoarthrosis or hypertrophic arthritis a form of degenerative joint disease which involves the joints of axial skeleton as well as the extermeties[1]. There is progressive loss of articular cartilage, bone proliferation, joint deformility and varying degree of instability leading to loss of function. The cause is not known and it affects articular cartilage of previously healthy joints (Primary)[2]. Secondary Osteoarthritis may occur early in life following abnormality in joint such as previous intraarticular fracture, due to repetitive strains as in high level sportsmen or strains in abnormal directions such as following fractures which have healed in an abnormal alignment[3]. The patients present with recurrent episodes of pain, effusion stiffness and progressive limitation of motion. There are several NSAIDs available to treat OA. The objective of the present study was to compare the efficacy and side effects of indigenous drug wth Ibuprofen in patients of Osteoarthritis.

Material and Methods

A total number of 80 patients (Age range 36-73 Years) with diagnosis of Osteoarthritis were selected from the outdoor patient department of Physical Medicine and Rehabilitation, AIIMS, New Delhi. All the patients enrolled in this study had their history recorded, General Physical Examination and detailed joint examilnation was done. All patients had their X-Ray of the Joint, hemogram, urine examination, blood sugar and serum uric acid levels done. All the patients were asked not to take any drug without informing us. After randomization in the two groups of 40 patients each were asked to take indigenous drug Rumalaya or Ibuprofen tablet (400 mg) at 8 hourly intervals after meals. All the patients were assessed for tenderness, swelling, stiffness, range of joint motion and for joint pain before drug therapy and after drug therapy at 2 weeks and at 6 weeks time interval. Patients with any other major illness were excluded from the study.

Results

The assessment of pain relief was done on a numerical scale (1-10) before starting drug therapy and at 2 weeks and 6 weeks after drug therapy. On statistical analysis (Two way analysis of Variance) of mean pain intensity scores the results show that indigenous drug and ibuprofen provided significant pain relief at 2 weeks ($P<0.001$) and 6 weeks time interval ($P<0.001$)

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when compared to pain of the initiation of therapy, at rest, on walking and squatting. On statistical analysis (t-test) between the two treatment groups no significant difference ($P>0.05$) was observed between the two drug at 2 weeks and at 6 weeks time interval. No significant change was observed in either group of patients in their swelling, stiffness and range of motion of joint. No patient reported any side effect with either medication.

Discussion

The results of this clinical study show that both the indigenous drug and Ibuprofen are effective in controlling pain at 2 weeks and 6 weeks time interval. Furthermore on comparison of pain relief (as judged by pain intensity scores) it was found that there was no significant difference between the two treatment groups. Hence both drugs are equally effective. But the indigeneous drug is cheap in cost compared to ibuprofen tablet. Thus, indigenous drug may be prescribed in patients as an alternative to Ibuprofen in patients suffering from Osteoarthriltis. In this study no patient reported any side effect. The non sterodial drugs are known to cause G-I toxicity including ulceration[4] and even major GI bleeding particularly in elderly patients. In our study no such side effect or toxicity was observed due to ibuprofen. Perhaps a larger sample would be necessary to find out the comparative toxicity and other un-toward effects.

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Methotrexate as Remission Inducing Agent in Rheumatoid Arthritis.

Dr. Ali Mohmad Burhoo

Abstract

Rheumatoid arthritis is a chronic multi-system disease of unknown etiology with remissions and exacerbations of inflammatory attacks leading to joint destruction and deformity. The patient becomes crippled within due course of time. NSAID's give temporary relief of inflammation and have side-effects. Steroids induce remissions but have to be continued for a long time and gradually toxic effects develop. Second line drugs are costly and have delayed onset of action. Methotrexate has been used to induce remission early and has less side effects. It can be continued for a long period of time.

20 patients with active rheumatoid arthritis and in early synovial or arthritic stage, were given low dose methotrexate along with NSAID's. Patients with normal hepatic, renal, cardiac and other systemic functions, of either sex, were given the drug at 7.5 mg weekly dose and the signs of symptoms monitored at weekly intervals for first three months and then biweekly for another three months. The toxic effects of drug were also monitored. The results were encouraging at 24 weeks in terms of control of pain, disappearance of swelling of joints, improvement in morning stiffness and increase in ROM of joints. These patients did not develop any major toxic effects and could be subjected to physiotherapy easily and their joint functions and muscles were maintained for full activity. Few patients developed gastrointestinal side effects and were given foliate derivatives to overcome it. Hence it is concluded that Methotrexate at weekly dose of 7.5 mg could be used safely for rheumatoid arthritis patients along with NSAID's for inducing remission.

Introduction

Rheumatoid arthritis is a chronic multisystem disease of unknown etiology with a prevalence rate of approximately 1%. The remissions and exacerbations of synovial inflammation lead to cartilage destruction and bony erosions, resulting in joint deformity. The patient becomes crippled and bedridden in due course of time and this is the hallmark of disease. Hence the primary aims in the treatment of Rheumatoid arthritis are to reduce joint pain and inflammation, maintain joint mobility and range of motion, and prevent deformity. A potential goal is to retard disease progression. These aims can be achieved by a drug which induces remission earlier and is less toxic. The first line therapy, consists of non-steroidal anti-inflammatory drugs(NSAID's) i.e., aspirin. It was used first in 1938. These drugs give symptomatic relief of pain and inflammation rapidly but cannot halt the progression of disease. They have adverse side-effects including allergic reactions, G.I. disturbances, renal toxicity and cannot induce remission.

Second line drugs known as disease-modifying anti-rheumatic drugs (DMARD's) and slow-acting anti-rheumatic drugs (SAARD's)

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e.g., antimalarials, D-pencillamine, Cyclosporin and methotrexate, have the potential to retard disease progression and induce remission but they have slow onset of action. They have severe toxic effect, minimal analgesic activity and are costly. Steroids have been used in combination with other drugs to induce remission, but due to their adverse effects, especially in elderly patients and long term maintenance therapy, they are not ideal for use.

Hence a drug which has minimal toxic effects, modifies the course of disease, halts progression of bony erosions and has rapid onset of action, is ideal for preventing morbidity and crippling condition of the patient. Methotrexate (amethopterin) a foliate analogue, fulfils most of the above needs and is currently in large use for rheumatoid patients. It inhibits dihydrofoliate reductase and thymidylate synthetase and has oral bioavailability of approximately 15 to 20 % less than intermuscular or I/V route. 35-50% is bound to albumin and elimination rate is 7.1 to 7.4 hrs, mainly through kidneys. It has emerged as a highly useful agent, being used at a very low dose, with a more rapid onset of action (two to six wks.) than other second-line drugs.

Material and Methods

Patients of either sex attending the department of Physical Medicine and Rehabilitation, IMS Srinagar from 1996 till date with classical or definite Rh. arthritis and with active disease having synovial or early arthritis stage, were taken up for this randomized study. These patients were treated with low dose methotrexate either on OPD basis or were admitted in the ward. The criteria for selection of cases was as under :

- Age : between 18-60 years
- Sex : both males and females
- Pts. with classical or definite

Rh. arthritis as diagnosed by revised ACR criteria 1987.

- Patients with active arthritis e.g. : Rithchie's score of 5 with six swollen joints and raised ESR and without joint deformity or systemic involvement.

The following patients were excluded from the study :

- Patients having advanced disease and crippled with multiple joint deformities.
- Proceeding treatment with sulphasalazine or other second line drugs.
- Patients with contraindications to MTX therapy i.e., hepatic, renal, cardiac, G.I. or haemopoitic disorders and other systemic diseases.
- Very old patients, uncontrolled diabetics, malignancy, pregnant women and blood dyscrasias.

These patients were evaluated on OPD or indoor basis and a complete history and clinical examination done, important signs and symptoms such as pain and swelling of joints, morning stiffness, ROM of joints, stiffness and contracture of joints and general well being noted. All the laboratory investigations for haemopoitic system, kidneys, liver, heart, lungs and other systems were done and recorded. Immunological assay for Rh. arthritis such as RF, CRP, ASO, ANA and other immunoglobin profiles were also done. These tests served as a baseline and for watching any toxic effects of the drug subsequently when these tests were repeated.

Dosage

Methotrexate was given as a single dose of 7.5mgs per week. Three tablets of 2.5mg were given together or in divided dose in one day/week. Other NSAID's such as nimesulide (100mg) or diclofenac (50 mg) were given along with MTX initially. The tolerability of the drug and development of any toxic effects was monitored

and dose increased gradually to 10-15 mg/week for full response, in some patients. The drug was given at weekly single dose for 12 weeks initially and the dose reduced to 5mg/week in those patients who achieved good response. No steroid or second line drug were given concomitantly. The drug was continued at a minimum dose for 24 weeks and results analysed. The base line investigations were repeated at two weekly intervals for first three months and then monthly for another 3 months to know the development of toxic effects of the drug.

Evaluation

These patients were followed up at weekly intervals for Ist three months and then two weekly intervals for another 3 months and results finalised at 6 months. The evaluation was carried out on clinical basis i.e. in terms of control of pain and swelling of joints, decrease in morning stiffness and contracture of joints, increase in ROM of joints and general well being of patients. The tolerability of drug and development of any side-effects was monitored, various laboratory investigation of liver, kidneys, heart, haemopoitic system, lungs and G.I. tract were repeated at two weekly intervals for first 3 months and then monthly for next three months, for detecting any toxic reaction to the drug. The role of drug as remission inducing agent was finalised at 6 months therapy.

Observations

This study explored the efficacy of MTX as remission inducing agent due to its significant effect on primary outcome variable-the DAS. Difference was significant at the mean DAS corrected at 0 weeks as well as the difference between 0 weeks and 24 weeks. The individual components of DAS all changed in favour of MTX as primary remission inducing agent.

This randomised study was conducted on 22 patients of classical or definite Rh. arthritis patients attending the department of PM&R of SKIMS Srinagar from 1996-1997. The age or patients ranged between 18 to 60 years with maximum number of patients in the 4th decade (9 patients). There were 17 female and 5 male patients and all except one girl of 18 years age were married. All of these patients had multiple joint involvement especially of hands, wrists, feet, ankles, elbows etc. with swelling of these joints and decreased ROM. Other large joints such as knees, shoulders, hips and spine were involved in a few cases only. Maximum number of patients (17) had morning stiffness. The involved joints were swollen and tender, with decreased ROM. Only few patients (5) had joint deformities such as flexion contracture of fingers, wrist and elbow and boutonnaire deformity of fingers.

The R.F. was positive in 18 patients and 4 patients were seronegative. The X-rays of hands of these patients were almost normal expect for osteoporosis and decreased joint space in 8 patients.

The other associated diseases observed in this series were hypertension in three cases NIDDM in one case, OA knees and Cushing's Syndrome in one patient each. The various joint areas involved were mainly of hands and feet bilaterally. In hands the MTP joints followed by PIP joints were involved. Similarly in feet joints of intertarsal region and MTP joints and PIP joints were involved. The other joints involved in order of frequency were wrists, elbows, ankles and knees. Shoulders, Hips and Spine were not involved much.

Results

MTX was given at low weekly doses with the primary aim of inducing remission at an early stage. These patients were followed up at 2,4,6,8,10,12,16,20 and 24 weeks and their

symptoms and signs assessed. The clinical criteria applied for assessment of remission was as under :

A. Full Control of pain and morning stiffness.
B. Reduction of swelling of joints.
C. Increase in ROM of joints.
D. No tenderness of joints and periarticular tissues.
E. Overall well being of patients and useful return of function of joints.

In all these 22 patients there was no response at two weeks follow up. Only few patients (five) started showing clinical improvement at 4 weeks. There was reduction in pain and morning stiffness and swelling had started becoming less. Tenderness of joints continued and ROM was still painful in these patients. At 6 weeks maximum number of patients (10) had clinical response to the drug. Two patients out of 22 were lost to follow up after 6 weeks. At 8-10 weeks all the 20 patients had improved and were in complete remission. There was no swelling of joints. Pain and morning Stiffness was absent. ROM of joints was full and painless. Soft tissues contractures had become less and therapeutic exercise and passive stretching was possible easily in these patients. These patients had returned to their job. After 6 weeks of therapy the dose was increased to 10mg/week in 10 patients for achieving full response and at 12 weeks it was again reduced to 7.5 mg/week. From 12 weeks onwards the dose of the drug was again reduced to a minimum level of 7.5 mg/Week in all these patients. The patients were followed up at 4 weekly intervals after 12 weeks and were investigated for any toxic effects to liver, kidneys heart and blood etc. Two patients out of 20 developed gastrointestinal upsets and there was epigastric sensation and mild upper abdominal pain. They were given foliate derivatives and antacids to overcome such side effects. No other major side effects were seen upto 24 weeks. Retrospectively 6 patients were followed-up for one year and it was observed that are they having complete remission and without any toxic effects of the drug.

Discussion

Rh. arthritis is a chronic inflammatory process with remissions and exacerbations. The inflammation of synovial tissue and periarticular tissues continues till joint structures including articular cartilage and bone is destroyed and joint develops contracture and ankylosis thus rendering the patient crippled. Hence there is need for a drug to arrest inflammation and stop further progression and recurrence of disease. The disease being immune-mediated an immunosuppressive drug like MTX can reverse the above phenomenon and the patient can be saved from being crippled. This should be achieved early in the disease process before permanent damage to the joint structure occurs. In this randomised study on 20 patients MTX has given encouraging results and it was used at a very low dose, in patients with early stage active disease. NSAID's were also used for short duration till remission occurred. The patients were of either sex with 15 females and 5 males and between 18-60 yrs. of age. Females were usually housewives. Maximum patients (13) were between 30-50 years of age.

A low dose of MTX i.e. 7.5 mg/week was used in these patients and remission was observed between 6-8 weeks in maximum number of cases. Few patients showed response at 2-4 weeks only. Hoffmeister R.T. (1972) studied 29 patients using MTX 10-15 mg/wk and observed beneficial results. Steinsson K. Weinstein A (1982) studied 21 patients for a mean duration of 38 weeks with 7.5-25.0 mg/wk dose of MTX 52% patients were responders. 17 patients showed a

sustained response after 42 months of treatment completion. Michaels RM, Nashel DJ (1982) reported marked improvement in 79% of patients in 4 weeks with a dose of 50 mg/wk of MTX with total duration of treatment for 7-20wks. Thus our observations are consistent with the above author's and the role of MTX as remission inducing agent is clinically acceptable.

Randomized placebo controlled trials were conducted in patients who had failed to respond second-line therapies, including gold salts and D-pencillamine by Thompson RN (1984) in 48 patients with significant improvement in 6 weeks with 10-25 mg/wk dose of MTX, Weinblatt ME (1985) in 35 patients with 7.5-15.0 mg of MTX/wk for 24 weeks and observed beneficial results within 12 wks, William's HJ and Willkins RF in (1985) observed good results with 7.5-22.5 mg/wk of MTX for a period of 3 months to 10 years.

MTX has been found superior to other second-line drugs like Azathioprine, Cyclosporin. A and parental gold as observed by Hamdy H, Liver JA (1987) in 40 patients; Arnold MH (1990) in 53 patients; Weinblatt ME, Kaplan H (1990) in 281 patients and Cohen S. Rustein J (1993) in 264 patients for 34 weeks.

* MTX induces remission in patients resistant to sulphasalazine as observed by C.J. Haagsma, C.M. Vanriel in (1994) in 24 weeks with a dose of 5-15 mg/wk.
* Intramuscular MTX is more efficacious than oral administration in patients of rheumatoid arthritis as observed by R.A. Halminton (1997) over a period of 6-18 months.
* Supplementation of folic acid during MTX therapy reduces the risk of toxicity as observed by Surah L Morgan (1994) in 79 patients between 19-78 years of age.

In the present study MTX was used safely without any untoward side effects to the patients. No major toxic effect was seen. However, two patients developed gastrointestinal upsets which was corrected by folic acid derivatives and antacids and the drug was not discontinued.

Bannwarth B. Labat L (1994) has observed adverse effects like GI upsets in 60% patients, cytopenia in 5-25% patients, respiratory symptoms in 0.7-7.7% patients and alopecia in some patients which were successfully managed with temporary discontinuation, dose reduction or by administration of folic acid derivatives, Bridges SL Jr (1989) observed hepatotoxicity in 25.6% patients. MacDonald DR (1991) observed dizziness, vertigo, headache and congnitive dysfunction in his study with MTX.

Conclusion

This randomized study conducted on 20 patients with low dose MTX i.e. 7.5-15mg/week for a period of 6 months has given encouraging results with remission occuring between 4-8 weeks of therapy in maximum number of patients. These patients were in synovial or early arthritic stage with active diseases and without much deformities. They were not suffering from any other systemic illness which would be a contraindication to the drug. No untoward side effects were seen except for mild upper GI discomfort in few cases only. The idea of using MTX as first line drug inducing remission has been achieved in this short duration trial. Hence MTX is recommended as first line drug along with other NSAID's to arrest inflammation and further progression of disease so that the integrity of the joints and periarticular tissues is maintained and reasonably good function and overall well being of patient is achieved.

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IJPMR 8-9, April 1997-98 *Review Article*

The Vertebral Artery Syndrome A Review Article

Dr. T. Raghuram, Dr. . S. Rastogi

Abstract :

Vertebral artery syndrome, although commonly due to cervical spondylosis and cerebral atherosclerosis, can be due to several other causes. Due to the anastomosis between vertebrobasilar and carotid artery systems, involvement of the later by atherosclerosis is critical to the development of symptoms. A variety of cerebral and other symptoms might develop; vertigo visual disturbances, sensory and motor deficits being the prominent ones. A combination of these factors is necessary for the diagnosis. Anatomical aspects, vertebral arteriography and conservative and surgical treatment modalities are also described. Proper investigation to find out the etiology is stressed.

Keywords :
Arteriography Atherosclerosis, Cervical Spondylosis, Vertebral Artery syndrome, Vertebrobasilar Insufficiency Vertigo.

The Vertebral Artery Syndrome

The vertebral artery syndrome is one of the common conditions encountered in orthopaedic, ENT and neurologic practice. It is characterises by recrurrent transient episodes of relative ischemia at the base of the brain, producing cerebral symptoms of vertigo, nystagmus, ocular symptoms and so called 'drop attacks' due to temporary occlusion of the vertebral artery caused by rotation and hyperextension of the neck. Also called vertebro-basilar insufficiency (VBI), it is caused by a variety of causes ranging from cervical spondylosis to tumour emboli. As far as Orthopaedicians and Physiatrists are concerned, a combination of arteriosclerosis of cerebral vessels and cervical spondylosis is fundamental to this syndrome.

About 50% of people over the age of 50 and 75% over the age of 65 years have typical radiological changes of cervical spondylosis[35]. Furthermore, 40% of those over 50 years had some limitation of their neck movement, while 60% had some neurological abnormality[23]. Likewise postural vertigo is also a very common symptom in greater than 50 years age group. But all cases having symptoms of vertebrobasilar insufficency with suggestive radiological features of cervical spondylosis cannot be bindly labelled as due to the latter. A diligent search should be done to rule out other causes before making this diagnosis.

The syndrome of vertebro-basilar infraction was first well defined in 1946 by kubik and Adams. Millikan and Siekert emphasised the frequent occurence of symptom-complexes which were initally of transient character and served as warning

of independing vertebro-basilar infraction, i.e. Vertebro-basilar Transient Ischaemic Attacks. Since then many authors have described this syndrome, vertebral arteriography as well as treatment of this condition.

Relevant Anatomy

The Vertebro-basilar system consists of

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TABLE -I

ETIOLOGY OF VERTERAL ARTERY SYNDROME

TYPE	CAUSE
EXTRINSIC	COMPRESSION KINKING
INTRINSIC	ATHEROSCLEROSIS ARTERITIS THROMBOSIS CONGENITAL ANOMALIES.

TABLE-II

SITES WHERE VERTEBRAL ARTERY IS PRONE TO INJURY (BY TRAUMA OR MANIPULATION)

	SITE	CAUSE/MECHANISM
1.	Entry into the foramen transversarium of C_6 vertebra	flattening and kinking of subclavian artery against last cervical vertebra and scalene muscles.
2.	Anywhere in the bony canal (C_1 - C_6)	Secondary to the displanement of foramina following fracture dislocation of the spine. — Particualarly susceptible to the stretching and shearing forces
3.	Intervertebral foramen of atlas and (C_1 - C_2) Junction	— Atlanto-axial dislocation causing compression,chiropractic manipulation.
4.	Course of the artery from C_1 foramen to entry into the skull	— Stretched a roles bony structures and atlanto-occipital ligament.

two vertebral arteries joining together to form basilar artery at the base of the brain. It communicates with carotid supply through two posterior communicating branches. The vessels supplying the brain anastomose at three different levels:

1. Extracranial
2. Circle of Willis
3. Leptomeningeal

The Vertebral artery arises from the subclavian artery adjacent and proximal to the origin of the internal mammary and thyrocervical arteries. It passes posterosuperiously to enter the foramen transversarium of the sixth cervical vertebra. This has been reffered to as the first part of vertebral artery.The Vertebral artery ascends vertically encased in the bony canal formed by the transverse foramina of the upper six cervical vertebra lying anterolateral to the neurocentral joint of Luschka (the second part of the vertebral artery). The third part of the artery emerges from the transverse foramen of the atlas and runs horizontally posteromeadially on the posterior arch of the atlas. The fourth part of the vertebral artery passes anterior to the oblique liagment of atlas entering the vertebral canal and then ascending up intradurally in to the posterior fossa to join its counterpart to form the basilar artery.

Spinal branches arise from second portion artery, pass through the intervertebral foramen to enter the vertebral canal and give off twigs to the roots of spinal nerves which anastomose with the anterior and posterior spinal arteries, These may be impinged upon by osteophytes in cervical spondylosis and cause additional ischemic cord damage[31,34].

Pathology and Etiopathogenesis

In a normal person, there is a decrease in vertebral artery circulation on one side when head is turned backward and to opposite side. There are no symptoms during this as there is adequate collateral circulation from the other side and from the carotids. Only when these arteries and diseased or absent there will be symptom and signs[10](Table 1).

During ordinary head movement of daily life there is an asymmteric eccentric rotation of the atlas fixed on the atlantooccipital joint of opposite side.On rotation to right the right atlantooccipital joint is fixed and the left side of the atlas rotates on axis, first asymmetrically and then symmetrically[36]. Ponticles of the atlas are considered a significant factor in vertebrobasilar insufficiency[6].

The circulatory effects occur when there are vascular abnormalities, when there is moderate to severe arteriosclerosis, when only the vertebral artery is filling the basilar system, when there is pressure on the vertebral artery by cervical osteophytes (Radner) or when there is an incipient thrombotic lesion in the basilar system[10,36].

There is another mechanism for the compression of the vertebral artery which is relevant surgically [11]. The posteroir origin of the vertebral artery lies between the vertebral column posteromedially and the part of the subclavian artery anterolaterally covered by the anterior scalene muscles. Turning the head more or less flattens that segment of the subclavian artery against the last cervical vertebra and kinks its origin leading to vertebrobasilar insufficency in people with deficient intracranial anastomoses. With ageing elongation of the vertebral artery occurs, predisposing to kinking in vertebral and subclavian arteries leading to vertebrobasilar ischaemia[11].

In degeneartive disease of the cervical spine, the osterophytes at the intervertebral foramina displace and compress the vertebral artery. This is increased on hyper-extension and rotation of the neck to the opposite side. This

osteophytic compression is most pronounced at C5-C6, less often at C4-C5 and much less commonly at C3-C4 and C2-C3[24,31]. In the presence of advanced cervical degeneration only a small amount of neck motion may be sufficient to cause complete vertebral artery block. Stenosis and occlusion of other major cerebral vessels due to atherosclerosis or developmental anomalies predispose the subject to symptoms due to spondylotic vertebral artery compresion[31], thus increasing the frequency of ischemic episodes (cervical migraine of Bartschi-Rochaix w)[24]. Repeated ischemic episodes enventually produce permanent brain stem damage. It is gradually becoming more apparent that spondylotic compression of the vertebral artery may be responsible for a chronic or an acute central hypoxic gradient in the cervical anterior spinal artery resulting in a syringomyelic lesion [24].

Hemodynamic factors have been attibuted an important role in the genesis of symptoms of vertebrobasilar insufficiency whose incidence is 31% in catroid stenosis[38]. Disappearance of Transient Ischemic Attacks (TIA) in vertebro-basilar territory was noted after endarterectomy in patients with severe catroid stenosis while no benefit was seen in patients with less than 50% stenosis[22].

Anomalies of the circle of willis or the major arteries have a significant role in the development of both hemodynamically and thromboembolically mediated posterior circulation (VBI) symptoms in the presence of catroid stenosis[22]. Thus due to collateral deficiencies or secondary intracranial disease, however the terminal distribution of an artery may be relatively ischemic or atleast unable to compensate for a fall blood pressure in the presence of an extracranical obstruction, though the total flow is normal[33]. If stenosis of the vertebral artery develops slowly, sufficient collateral circulation may form distally.

Cervical spine trauma and injury to the neck can lead to symptoms of vertero-basilar insufficiency. Bose et. al (1985) reported a case of transient ischemia in the distribution of basilar artery following a C4-C5 fracture-dislocation (with quadriplegia) during rugby. Traumatic internal catroid artery thrombosis or spasm in cranicocervical trauma may be present whenever a severe contusion is noted in the cervical area as also in manipulation of the neck[29] which is due to injury at different sites (Table 2). vertebral artery syndrome can occur due to cervical sprains and cervical herniated discs[20].

Vertebral artery injuries have been described following yoga cervical manipulation, callisthenics, trauma, overhead work and cervical traction. All mechanism of injury involve either cervical hyperxtension, excessive contralateral rotation or most commonly, a combination of both[28]. Distal vertebral artery and basilar artery are injured in the form of intimal tears, pseudoaneurysm formation, AV fistulae, subintimal hematomas and dissection and complete thrombotic occulsion. Intermittent or partial obstruction of the blood flow in the vertebral artery may lead to a secondary thrombosis of the basilar artery higher up in the ciculation leading to brainstem ischaemia, infraction and eventually softening in the cerebellum and the brainstem[15,18,31]. Symptoms can occur by patient moving his own neck in specific position (hyper-extension or rotation) and last for few minutes after reversing back to neutral attitude[3,36].

A defective odontoid process due to injury or devlopmental defect leads to excessive mobility and displacement of axis with transient obstruction of vertebral artery and symptoms of VBI[15,36]. Cogenitial anomalies in the vertebrobasilar and cartoid systems, basilar artery hypoplasia and aneurysms of the vertebral artery termination or of the vertebrobasilar junc-

tion can produce symptoms of vertebrobasilar insufficiency[34]. Other causes are fibromuscular hyperplasia, cranial arteries and fusiform ectasia. The factors that must also be considered include hypotension, hypertension, cardic arrhythmia, platelet or septic or tumor emboli, polycythemia, hyperlipidaemia[4,35].

Artherosclerosis of extracranial vessels is an important concominant of this syndrome. Extracranical vessels are more commonly involved than intracranial vessels. The proximal portion of the left subclavian artery and both proximal vertebral arteries are frequent sites of obstructing atherosclerotic lesions[13] as are also internal catroid artery and bifurcation of catroids. In carotico-vertebral stenosis, collateral flow maintain circulation in midline vital centres but areas of hindbrain become infracted. Atherosclerosis of the vertebro-basilar system is only seen in the basilar artery and third and fourth part of vertebral artery[16]. However with cervical spondylosis, atherosclerosis may also be seen in second part of vertebral artery.

The vertrebral and basilar arteries are, for their size, amongst the most important in the human body and vital to the continuation of life just like the coronaries. Multiple neuroanatomical structures are concentrated in areas of their primary supply which include medulla, pons, midbrain, cerebellum, thalamus, part of posterior cerebral cortex (visual cortex and inferior basal areas of temporal lobes) and cervical spinal cord. With diminshed blood flow through the internal auditory artery vertigo and impairment of hearing may be present. Hypoxia to the nuclear regions in the brain stem supplied by the pontine arterial branches may result in diplopia. Transient blindness may follow decreased circulation in the posterior cerebral arteries which supply the visual cortex in the occipital lobes. Reduced blood supply in posterior inferior cerebellar arteries results in 8,9,10 and 12 cranial nerve impairment. Vertebro-basilar insufficency can take two different forms :

(a) Intermittent insufficency due to transient repetitive occulsion of a major vessel, usually one of the vertebral arteries.
(b) Steady reduction of the vascular reserve, due to thickening of the walls of small and middle size arteries with eventual formation of small infracts[8].

Clinical Approach to a patient of Ver--tebral Artery Syndrome

A patient with vertebral artery syndrome, in addition to its features,has features of causative condition like cervical spondylosis or artherosclerosis. The symptoms can be inferred as vascular because they are often transient and episodic involving regions of the nervous system above the rarely below the cervical area and precipitated in a predictable manner by hyperxtension and rotation of the neck[31].

The typical symptoms are vertigo, light headedness, hearing loss, visual symptoms like diploma, visual field defects, floating black dots that may have scintillating margin, paresis, ataxia, numbness etc. (Table 3)[4,11,18,31,36].Rarelly there are complaints of paraesthesias of upper thoraic dermatomes due to interference with blood supply of anterior spinal artery. In some patients of cervical spondylosis there is wasting, weakness of the hands with depressed tendon jerks and spasticity of lower limbs due to direct compression of the spinal cord and nerve roots by the osteophytes.There is frequent occurence of symptoms and signs due to compression of the vertebral artery in the neck in cervical spondylosis (although this should not be over diagnosed-35, Table 4), these may occur in the absence of compression of cervical cord and roots. They are reversible in early stages (i.e. amenable to treatment), but later lead to progressive irreversible brainstem damage[31].

TABLE-III
CLINICAL PICTURE OF VERTEBRO-BASILAR ARTERY INSUFFICENCY

S. No.	SIGNS & SYMPTOMS	ANATOMIC SITE
I.	**MOTOR WEAKNESS**	
1.	Hemiparesis	Corticospinal fibres
2.	Quadriparesis	Corticospinal fibres
3.	Paraparesis	Corticospinal fibres
4.	Spasticity	Corticospinal fibres
5.	Facial	Cranial nerve VII
II	SENSORY LOSS	
1.	Face	Spinal tract of V
2.	Extremities & Trunk	Spinothalemic tract
III	**VISUAL**	
1.	Diplopia	Cranial nerves and nuclei of III, IV, VI.
2.	Conjugate gaze palasy	Paraabducens nuclei.
3.	Horner's Syndrome	Descending sympthaetic tract.
IV	**ATAXIA**	
1.	Gait	Inferior cerebellar penduncle, cerebellum midline.
2.	Limb	Cerebellar hemisphers.
V	**Unilateral Tremor**	Cerebellum and red nucleus fibres.
VI	**Slurred Speech (Dysarthria)**	Corticobulbar fibres (to 9,10, 12 cranial nerves).
VII	**Swallowing Problem (Dysphagia)**	Nucleus Amiguous
VIII	**Nausea and Vertigo**	Vestibular Nucleus.
IX	**Hearing Loss**	Auditory Nerve
X	**Temporal lobe seizures and Peduncular hallucninosis**	Temporal lobe.
XI	**Coma**	Reticular formation
XII	**Drop Attacks Headache**	Ischaemia at pyramidal decussation.

TABLE-4

Incidence of symptoms in vertebral artery syndrome

S. No.	Symptoms/Signs	Incidence out of 25 cases
1.	Dizziness and/or Vertigo	18
2.	Episodic visual disturbaness	14
3.	Ataxia-Transient or evident to the examiner	18
4.	Drop Attacks	2
5.	Postural Vertigo/blurred vision at examination	5
6.	Absence of dizziness and ataxia (both)	3
7.	Headache, neck pain	22 (Common)

A dizzy or giddy patient may have vertigo (i.e. spinning), unsteadiness (lightheadedness as in severe influenza) or the cause may be uncertain. Unsteadiness occur rarely in bed or with exercise and is seen when about to leave home during shopping and can occur due to 'Hyperventilation Syndrome'[4]. Crandle 1996 feels that vertigo seldom figures as a prominent symptom in large series of verified cases of cervical spondylosis. Compression of the vertebral artrery by osteophytes is not a very common disease[9,35].

Cervical vertigo can be seen in three groups of patients[27]-firstly in those with cervical spondylosis, secondly in those patients treated by neck traction and who devloped vertigo and finally in patients with certain types of neck injuries. The last group of patients, in whom vertigo is probably due to alteration in proprioceptic impulses reaching cerebellum and vestibular nuclei from end organs, complaining pain in the neck, stiffness and recurrent postural vertigo and nystagmus[36]. A combination of three symptoms and signs suggests the diagnosis of vertebral artrery syndrome or VBI rather than any one of them. When episodic postural vertigo is unaccompained by any other neurological symptom or sign, it is extremely unlikely to be due to VBI, more so secondary to cervical spondylosis, even if X-rays demonstrate the latter. These patients are treated symptomtically. This non-VBI vertigo can be a self limited idiopathic (epidemic) vertigo or a postural vertigo[8,35].

Abnormalities of occulomotor function are the early findings in vertebral artrery syndrome and are best noted when testing for optokinectic nystagmus[8].

Drop attacks which occur in some patients of vertebral artrery syndrome are pathognomonic. In this, on hyperxtension or rotation of the head, the patient develops tetraparesis or tetraplegia and falls to the ground without losing consciousness. Rapid recovery occurs in a few minutes.[31].

Vertebrobasilar ischaemic disease causing vertebrobasilar on non-hemispheric trasnsient ischaemic attacks (TIAs) are physio-pathologically of four type[25].

First type (21%) are non postural due to

atherosclerosis and thromboembolism, second type (4.5%) are postural, third type (20.6%) are mixed type while fourth variety (12.7%) are due to uncertain cause.

In diagnosing a case of vertebral artery syndrome, various causes of dizziness particularly due to labyrinthine or cerebellar disease should be excluded, whereas the drop attacks should be differentiated from epilesy, syncope and stokes-Adams syndrome. Two conditions that require description are catroid sinus syndrome and subclavin steal syndrome. The former can be diagnosed by carotid sinus senstivity and its cardioinbititory and vasodepressor reflexes in ECG while the catroid sinus is massaged. In the '*Subclavian steal syndrome*' the total cerebral blood flow decreases by 41% due to vertebral artery contributions to collateral circulation about the shoulder in a person with stensois or occlusion of the portion of the subclavian artery proximal to the origin of the vertebral artery[26].The symptoms of vertebral artery syndrome with arm symptoms occur on exertion of the upper limb with physical features of occulsion and ischeamia in the upper limb. Arteriograhy shows filling from opposite sided subclavian and vertebral arteries to ipsilateral vertebral and finally ipsilateral subclavian artery.

Investigations

A variety of investigative procedures may be required to establish the diagnosis as well as to detail the possible etiopathogenesis.

Vertebral Arteriography

Contrast medium (50% Renograffin or Hypaque) may be injected via a polythylene catheter inserted by the Seldinger method into the brachial artery in the antecubital fossa. Average vertebral artery in x-ray measures 3-4 mm in diameter. In 30% both are of equal size, in 40% left vertebral artery is large and 30% have larger right vertebral artery[34]. The vertebral artery in severe cervical spondylosis has a strikingly tortuous (wash board) appearance with multiple signoid curves, the lateral concavities of which lie opposite an intervertebral space. Stenosis is frequent and occulsion rare. Oblique and anteroposterior films show osteophytes pressing on vertebral artery. The stenosis becomes complete obstruction by rotation of the neck[31]. All patients with VBI symptoms have hemodynamically significant stenosis (i.e. more than 50%)[37].

Intrinsic cause of narrowing are asteriosclerotic tortuosity and antherosclerotic plaques. Arteriosclerotic types of tortuosity occurs at two sites : firstly at the origin of the subclavian artery before it enters the foreman transversarium at C6 vertebra and secondly at the point where it leaves transverse foramen of atlas where it is so elongated and tortuous as to get kinked during extension and rotation of the neck to the same or opposite side[31]. Concomitant carotid angiography is must as their involvement is needed for symptoms to appear. In post-traumatic cases of vertebral artery syndrome also, cerebral arteriography is useful, when it might show site of oculusion of the vertebral artery and sometimes non-visualisation of basilar artery (especially the proximal part)[5,28].

Among other investigations, x-rays are worth mentioning first especially in cervical spondylosis[31]. Vestibulo-oculomotor tests like pure tone audiometry, caloric test and electronystatogram are required to rule out other causes. In vertebral artery syndrome the results may be abnormal although there is no consistent pattern[8,35]. Neurological tests including EEG may also be required. A CT Scan may be indicated in severe cases before embraking on medical treatment to exclude the possibility of cerebellar infraction or hemorrhage which require acute surgical decompression.

Treatment

In general, vertebral artery syndrome is treated conservatively. Surgery is warranted when disease is progressing as evident by increasing symptoms and neurologic deficits. During acute episodes complete bed rest for three weeks and instruction to avoid hyperextension and rotation of the head as much as possible. The treatment is directed at preventing attacks while collateral circulation is being reestablished. A light weight plastic neck collar can be given to reduce movement. In initial stages, prolonged, strong cervical traction and hot packs to the neck and postural training are often effective[20,31]. In severe compression and stenosis of the vertebral artery occurs, fragmentation and embolisation of mural thrombus can be prevented or reduced by anticoagulant therapy[31] which is also used in patients with TIAs or progressive stroke[18]. During this the therapeutic prothrombin time levels are approximately 32 seconds and above[36]. Anticoulgant therapy (antiplatelet or antithrombotic) is statistically valuable (p=0.01) in prevention of vertebrobasilar infraction from TIAs. Xidifon has been used in vertebral artery syndrome during exacerbation[30]. Anticoagulant therapy with heparin is useful in cases after chiropractic manipulation[28]. Various causes which produce symptoms of vertebral artery syndrome also need appropriate treatment. For drop attacks a cervical collar, correcion of various causes of orthostatic hypotension are used.

For unilateral or bilateral internal catroid artery stenosis in association with symptomatic verterbrobasilar occulsive disease, catroid endraterectomy is done. It is the most widely used technique even in vertebral artery syndrome[11]. 93% became asymptomatic or improved postoperatively if posterior communicating artery was visualized preoperatively by angiography[17]. Endarterectomy can also be used for subclavian and vertebral artery (here along with dilatation) stenoses in selective cases[7,11,33].

Other surgeries available for vertebral artery syndrome and subclavian steal syndrome are scalenotomy, vertebral artery bypass[2], direct subclavian to common catroid anastomosis, aorta to subclavian and common catroid bypass and division of periarterial constricting or restricting fibrous bands[11,13]. In cases of vertebral artery syndrome due to cervical spondylosis, fixation of neck (fusion) to limit motion and decompression of the foreman transversarium by transveresectomy and uncossectomy can be done[31,32]. In cases due to cervical sprains and cervical herinated discs, stabilisation is useful in severe cases[20].

Conclusions

Vertebral artery syndrome can be due to multiple cases. A detailed clinical workup of the patient wih suggestive symptoms followed in some cases by angiography can lead to proper diagnosis. Treatment is generally conservative although surgery may be needed in some cases. Tendency to label all cases of vertebral artery syndrome where x-rays show cervical spine osteoarthritis as due to cervical spondylosis should be avoided and replaced by an urge to probe for the underlying cause.

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Adhesive Capsulitis Treatment with Oral Steroids

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Abstract

Sixty patients of Adhesive Capsulitis shoulder were studied. The patients were randomly placed in two treatment groups. One group received short course of oral prednisolone, and other group received no specific medication. The patients in both the groups were advised to perform pendular exercises at home. The improvement in night pain showed a significant difference in two groups, with the prednisolone treated group improving rapidly. The recovery in pain at rest and on movement and improvement in range of movement was not significant.

Introduction

Adhesive Capsulitis of shoulder is a common cause of severe and prolonged disability. The syndorme is characterized by pain and limitation of shoulder movement in absence of any recognised intrinsic abnormality. It was first described by Putman in 1882 [1] and later by Codman[2] The initial presentation is the pain, which is generalized and referred to upper arm, the back and the neck. The pain is more severe in early stages and disturbs sleep. The limitation often persists even after prolonged follow up [3,4].

The pathogenesis of adhesive capsulitis is uncertain. De Palma reported that any condition that hindered scapulohmeral motion, caused muscular inactivity and predisposes the patient to adhesive capsulitis[5] Neviaser[6] Found Capsular adhesions to under lying humeral-head upon surgical exploration for Adhesive Capsulitis.

Macnab[7] suggested that partial interruption in blood supply to a tendon can cause degeneration of tendon collagen flowed by a type IV auto immune reaction.

Bulgen et al reported an association between Adhesive Capsulitis and HLA B27 antigen positivity[8].

It is unclear whether the contracture of the shoulder capsule is a passive process related to lack of motion or on active associated with capsular inflammation.

Wide range of therapeutic regimens have been advocated for treatment of Adhesive Capsulitis. These include local steroid injec-tions [9,10] manipulation under anaestheasia,[11,12] Physiotherapy [13,14] traction [15] Radiotherapy[16] and Stellate ganglion blocks[17]. All these therapeutic measures have no long term advantage.

Blockey et al[18] compared oral steroids to placebo in 31 cases, and reported a significant improvement in plain but not range of movement. Kessel et al[19] found MUA and oral steroidsd more effective than MUA alone. Lioyd-Roberts and Fench[9] compared steroid injections and MUA to oral prednosolone and found the former regimen better. Bindr et al[20] in a conrolled study reported improvement in pain but not in range of motion. Non sterodial anti-infammatory drugs are widely used in the treatment of Adhesive Capsulitis but are of dobutful value[21,22,23]

The aim of this study was to ascertain beneficial affects of a short course of oral prednisolone therapy in patients of Adhesive Capsulitis.

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Table-I

Pain Complaint in 60 Patients in the Initial Visit

	No. of Patients	Percentage
Pain at night	36	60%
Pain at rest	10	16.6%
Pain on movement	14	23.3%
Total	60	100%

Table-II

A Comparison of mean and range of movement in total number of patients at 6 months follow up

	A) Initial Visit Mean	Range	(B) 6 Months Mean	Range
FLX	78°	50-90°	95°	80-110°
EXT	26°	20-30°	38°	30-50°
ABD	78°	60-90°	96°	80-110°
ADD	25°	20-30°	37°	30-45°
IR	31°	25-45°	46°	25-65°
ER	310°	25-45°	48°	30-65°

Table-III

Comparison of mean of movement in 2 treatment groups at At 6 months fellow up

Oral Steroid group (30 patients) : :			Non treatment group (30 patients)	
Mean Initial Visit (A)		Range 6 months (B)	Mean Initial Visit (A)	Range 6 months (B)
Movements				
FLX	78°	95°	79°	98°
EXT	25°	37°	26°	40°
ABD	76°	93°	80°	99°
ADD	25°	37°	24°	36°
IR	29°	47°	32°	45°
ER	31°	46°	31°	46°

Patients and Methods

Sixty 60 patients who complained of pain and stiffness of the shoulder were studied. The patients were selected according to the following criteria[24]:

1. Spontaneous onset of pain localized to shoulder region, pain increasing in severity and usually worse at night.
2. Limitation of all shoulder movements by at least 50%.
3. No clinical and radiological identification of lesion of Shoulder.

All these patients had restriction of active and passive movements of shoulder with pain and sleep disturbances of at least 1 month duration.

The patients with, history of generalized arthritis paptic ulcer, Diabetes, hemiplegias, serious infections, cervical radiculopathy and other contraindications to systemic steroids were excluded from the study.

There were 34 male and 26 female patients the age range was 45-70 (mean 55.4). The duration of presentation varied from 1-12 (mean 6.0) months. 41 patients had involvement of non dominant shoulder, and 19 of the dominant shoulder. The onset of symptoms was spontaneous in all the patients, 10 patients and history of mild trauma.

Pain X-rays of shoulder and haemograms in all patients were normal. HLA B27 antigen was done only 6 patients and reported absent.

The Clinical assessment was done before the treatment and at the end of 6 weeks, and thrice in next 6 months at 2 months intervals.

Pain was recorded as pain at night, pain on movement and pain at rest during the day.

The range of passive shoulder movement was recorded by a goniometer in six movement parameters of (FLX) flextion (EXT) Extension, (ABD) Abduction (ADD) Adduction, (IR) Internal rotation and (ER) External rotation. The variations between the patient range at the initial visit, subsequent visits and at the end of 6 months were recorded.

The patients were randomly placed in one of the two treatment groups.

A. Treatment group (30 patients)

Prednisolone 10 mg. was given to these patients as a single morning dose for a period of 4 weeks. The dose was then reduced to 5 mg. a day for another 2 weeks, before therapy was stopped.

B. Non Treatment Group (30 patients)

These patients were allowed to take non salicylate analgesic agents and Diazapam if the pain was not tolerated and had sleep disturbed.

The patients in both the study groups were advised to perform pendular exercise for 2-3 minutes every hour at home.

Results

All the patients before entering the study had received treatments with various drugs mostly NSAIDS, but only none (15%) reported little improvement in pain. The patients had not received any advice on physiotherapy or general management of shoulder. Only 10 patients are advised to gently move the shoulder and other to rest the shoulder.

At presentation 36 patients had pain at night and had disturbed sleep, 10 patients had pain at rest and 14 patients complained of pain on movement.(Table-I)

On examination at the first visit the mean and range of each movement parameter was as folllows : FLX.78O (50-90)O ;EXT 26 O (20-30O) ABD 787O (60-90)O ADD 25O (20-30O) IR 31O (25-45O); FR 31O (25-45O).

The recovery in range of movement was recorded in two treatment groups on subsequent visits and at the end of follow up (Table-II).

There was no significant improvement in treated group in recovery of individual movement parameter. Arm dominance did not influence the outcome (Table-III).

The two groups showed initial recovery in pain. The improvement in pain at night and pain at rest, showed severe pain when prednisolone

was withdrawn, which subsided spontaneously.

Out come at 6 months:

All patients showed improvement in pain during the course of study. 10 still had pain at the end of 6 months. A comparison of the range of movement in two groups was insignificant.

Discussion

The short course of oral prednisolone in some patients of Adhesive Capsulitis with intense pain and sleep disturbances is useful. This was not associated with any serious side effects. Severe pain recurred only in 4 patients when the prednisolone was stopped, NSAID were found to be of little value. 10 patients only had been advised to gently move the shoulder. Both the groups were advised home pendular exercises, A marginal improvement in patients in no treatment group suggested that pendular exercise may be important in initiating recovery.

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Psychosocial Outcome after Rehabilitation of Paraplegic Patients and the Factors Affecting Them

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Abstract

Paraplegic rehabilitation requires a multi- dimensional approach to the patient. One of the important factors that often is overlooked in the institutional care is the psychosocial and environmental barriers affecting the rehabilitation outcome. In our study we evaluated the psychosocial outcomes after discharge from rehabilitation for thirty patients.The level of rehabilitation was measured using ESCROW scale included in Long range evaluation system scale.The difference in the pre and post discharge score indicate that there is deterioration in the level of rehabilitation after the patient is discharged to home enviornment.Further it was seen that the there were better scores in group of pateints which were less educated, those living in town/village, traumatic paraplegics, lower level of injury, incomplete injury, duration of more than a year of paraplegia, less number of hospitalisations and medical complications.The other sociodemographic factors do not affect the ESCROW profile as seen in our study.

Introduction

Paraplegia is a condition that puts whole life of a patient out of gear. There are many factors which affect the rehabilitation ofparaplegic patients in addition to disease related factors. Sociodemographic factors play an important role as they are the ones which are inherent to the person and are not affected by the usual rehabilitation strategies employed at institutional level. Thus it is necessary to study those limiting factors which inspite of best medical management and rehabilitation may limit the persons autonomy to explore his/her enviorn ment .

There are many studies mostly done in western countries which address to psychosocial issues in paraplegics using different methods to evaluate the outcomes[1]. In a group of thirty patients we studied their sociodemographic variables and their effect on psychosocial outcomes using ESCROW scale[2].

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Material and Methods

Paraplegic patients attending the Department of physical medicine and rehabilitation at AIIMS were included with the duration of Paraplegia varying from three months to five years. Total of thirty patients were studied. The inclusion criteria being paraplegia of duration less than five years, those who received complete comprehensive rehabilitation and having absence of any medical complications necessitating hospitalisation other than those related to paraplegia. The exclusion criteria being patients of extremes of age (<15 and >60).

Functional evaluation and medical examination was done and sociodemographic data was collected. Each of the variables were then grouped into two or three groups for e.g

age was grouped as age less than thirty and greater than thirty years . ESCROW scores were then averaged for each group and the difference was then evaluated by comparing the mean and standard deviation values. Paired t-test performed to compare the significance of the observed values. The ESCROW score consists of following six factors i.e Environmental barriers, Social interaction, Cluster of family members, Resourses, Outlook and Work status. Each of above consists of four variables of varying independence scored from one to four. Score one representing minimum impairment and four representing maximum impairment. This was evaluated at discharge and at followup. The difference in score was then calculated and scores compared.

Results

The demographic profile of the sample group (Table-1) revealed that 60% of patients were of less than 30 years of age and 40% greater than thirty years, males were four times the females (m:f-4:1),60% of the patients were married at time of developing paraplegia, only 23% had completed their college education, maximum number of patients were residing with the parents(46.6%), 50% were residing in city and 5 and 10% in town and village respectively, 16.67% of the patients lived in multistoried houses without any lifts etc.

Variables which changed as an impact of disease were that one pateint got separated from the spouse ,one patient improved his educational status,50% of the patients had to change their vocation or had to leave the job which they were doing in preinjury period,56.6% of the patients had to change their living arrangement in order to adjust to the disability

Other variables related to disease which were studied are causes of paraplegia, site of injury, type of injury ,duration of injury,number of hospitalizations and place of discharge.

The scores were obtained at discharge and at follow up and the difference in score calculated.The mean and S.D calculated for each

Table-1

Disease related variables			
1.	Cause of Paraplegia	Traumatic -	76.67%,
		Non traumatic-	33.3%
2.	Site of injury	Dorsal-	50%
		Lumbosacral-	50%
3.	Type of injury	Complete-	26.67%
		Incomplete-	73.33%
4.	Duration	One year-	36.67%
		More than a year-	63.33%
5.	Hospitalisations	One-	70%
		More than one-	30%
6.	Place of Discharge	Home-	70%
		Other than home -	30%

Table -2

The ESCROW scores obtained

Score	Mean	S.D	Min. score	Max. score
Discharge	13.7	4.72	5	23
Follow up	12.66	4.51	5	23
Difference	1.433	3.03	-4	9

Table-3

Analyses of escrow scores in relation to sociodemographic variables

Variable	ESCROW score difference
1. Age - < 30	1.3 ± 2.9
	> 30 1.5 ±
3.3 2. Gender -males	1.4 ± 3.2
females	1.5 ± 2.1
3. Marital status	
single	1.5 ± 2.8
married	1.3 ± 3.4

(Pooled estimate of variance was not significant)

Table-4

4. Education	
Undergrad	1.8 ± 3.09*
Graduate	1.1 ± 3.9* 5.
Vocation	
No change	1.6 ± 2.7*
change	1.2 ± 3.3* 6.
Household	
parents/spouse	1.89 ± 3.4
others	0.63 ± 2.4
7. Residence	
town/village	1.6 ± 3.6
city	1.2 ± 2.8
8. House type-	
semipermanent	1.8 ± 3.6
permanent	1.2 ± 2.8

Then the score of the different groups of variables grouped togather and added in each group and the difference in scores evaluated for the statistical significance using paired t test.

As observed above that the scores ranged from very low to near normal. The negative value in the difference indicated that there is decrease in the psychosocial outcome scores indicating worsening of the condition of the patient in the community.

Further analyses of scores indicated that there was some change in the different groups of patients though their statistical analyses was not significant owing to less number of patients included in the sample size. However, being a pilot study it gave us clues regarding the direction of further studies on more patients.

Thus from above analyses we infer that the disease related variables affect the escrow score more than the demographic variables. The change in score was more in traumatic lesions, dorsal level, incomplete injury, duration more than a year, less hospitalizations, discharge to home, living arrangements with parents or spouse, less educated initially. Factors which do not influence the outcome are gender, marital status, residence, house type.

* Pooled estimate of variance not significant

Table-5

9. Cause of paraplegia		
traumatic	1.6 ±	3.3
non traumatic	0.8 ±	1.8
10. Site of lesion		
Dorsal	6.6 ±	2.1
Lumbosacral	2.2 ±	3.6
11. Type of injury		
Complete	0.3 ±	1.9
Incomplete	1.8 ±	3.3
12. Duration		
less than year	0.72 ±	
2.8		
more than year	1.8 ±	3.1

Table-6

13. No. ofhospitalizations		
one	2.7 ±	2.6
more than one	0.6 ±	3.07
14. Discharged to		
Home	1.6 ±	2.8
others	0.8 ±	3.5

Discussion

The observations in the study reinforced the facts highlighted in other studies[2,3] that there is no change in marital status as compared to normal population, poor vocational outcome and no change in educational level postinjury One contrasting study on a swedish community 4 reported that 80% of the paraplegics were engaged in gainful employment or education.The fact that extensive soceity support and stimulation along with better facilities can satisfy important needs and expectations of well functioning SCI subjects was highlighted .

Lack of adequate vocational rehabilitation [5,6,7] in post SCI patients is of same severity as highlighted in other studies. The possible reasons vary from general unemployment in normal population ,lack of motivation to work, lack of self confidence, lack of employers understanding regarding the ability of the injured, local distance to place of employment, insufficient adaptation of working place etc.In our sample however no attempt was made to analyze the cause of lack of employment in different populations, but there are problems awaiting solutions,such as improved facilities of employment for a disabled person and measured motivation to work.

Our study correlated with another large-scale study [8] which examined the relationship between life satisfaction to impairment disability and handicap and found positive impact of social integration ,occupation and mobility. The importance of social functioning level and assessment of architectural barriers and their bearing on daily living, social interactions and occupational outcome is evident in this study [9]. Psychosocial adjustment to disease showed decline in our study. Although specific inventories, were not used but general outlook and decision making capacity was evaluated in our scale [10,11] . The results of the above study points towards the fact that there are issues other than medical and physical rehabilitation which should be looked into if we want the fruits of institutional care to be effectively transmitted to the patients in the community.The environmental and sociodemographic factors are as important as disease related factors as the quality of life of patients with SCI is multidimensional.In this study we have tried to analyse these factors and the change in these as a result of comprehensive rehabilitation.It was set back to know that in some cases there was deterioration in the adjustment as indicated by negative score.This finding highlights the fact that rights of disabled patients

are largely neglected and compliance to laws on architectural barriers and reemployment are not cared for.Home visits and understanding of the family enviornment, adequate family support and society integration is essential for successful rehabilitation and continuity of education must be ensured at time of discharge.We obviously cannot rule out that due less no of patients and lack of sensitivity in our scale the definite recommendations and predictors of outcome are not defined but looking at the fact that the results match with some of the studies done using more elaborate scales we infer that this scale is though less sensitive but can be used to quantify the third dimension of rehabilitation which was for a long time totally neglected aspect of rehabilitation especially during a patients hospital stay where in medical problems take the centre stage.The present scales such as FIM etc have totally overlooked these facts and hence adding further to this neglect.Apart from ensuring complete functional and medical rehabilitation the sociodemographic,enviornmental and psycho-social factors affecting the patients autonomy should also assume importance prior to discharge planning and its continuity ensured in the community.

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Follow up Study of Rehabilitation of Spinal Cord Injury Patients Rehabilitated in Rehabilitation Research Centre from the Year 1984 to 1993

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Abstract

The Present study is analysis of spinal cord injury patients admitted in Rehabilitation Research Centre from the year 1984 to 1993. Out of 461 letters posted only 45 patients turned up for follow up. Comparisons were made from several studies conducted in western countries. Common findings and differences were observed and analysed to find out the reasons. Considerable similarities were found in age and sex distribution and level of injuries. Common cause of injury in India was different which can be explained by prevalence of high speed vehicles, sports injuries and violence in western countries.

Extent and depth of disabilities psychological and sexual implications renders the spinal code injuries most devastating calamities in human life. Due to improvement in medical care and rehabilitation services now majority of patients do arrive at a stage where they seek attention of community and are ready for rehabilitation within the community at large. Casual attitude towards safety measures among rural population needs to be corrected and emphasising that prevention is better then cure can reduce the incidence to a significant extent. Community resources should be mobilised with the help of voluntary organisations to make the disabled a productive member of society. It must be dealt as medical as well as a social problem.

Introduction

Spinal cord injury is one of the most devastating calamities in human life. The extant and depth of disabilities physically drives back the person to infancy as far as dependency for activities of daily living is concerned. Its psychological and sexual implications makes it a disease of social stigma. It demands many psychological adjustments from the injured person as well as his family and friends.

Due to improvement in emergency medical care a good number of seriously ill spinal cord injury patients survive. Better availability of rehabilitation services make them socially and economically productive.This brings about amazing reversal of attitude. A reversal now generally accepted and acknowledged. The present study has been undertaken to know the functional level of independence of spinal injury patients admitted in Rehabilitation Research Centre from 1984 to the year 1993.

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Material and Method

The present study has been carried out on spinal cord injury patients admitted in rehabilitation

research centre from the year 1989 to 1993.

From the bed head ticket available in the record room a list of all patiant who had suffered traumatic spinal cord injury was compiled and letters were sent to all patients for a follow up study.

Out of 461 letters posted only 45 patients turned up. Most of the letters were returned because of incomplete addresses, non availability or migration of patients leaving no forwarding addresses. Identification data were noted and patients were divided in rural and urban groups. Marital and employment status before injury and at the time of follow up was recorded.

On the basis of type of work different groups were made including farmers,skilled labourers and semiskilled workers. Date of injury,causes of injury and associated injuries were recorded.

Levels of spinal Injuries were recorded with the help of roentgenograms available. Complete and incomplete lesions were determined by complete neurological examination.Functional independence in various activities of daily living was considered as follows:

A total of ten items were included in four categories.

Self care

Grooming	
Eating	
Dressing upper body	*Independent/with assistance*
Dressing lower body	
Sphincter control	*Independent/with assistance*
Bowel management	
Bladder management	
Transfer activities	*Independent/ with assistance*
Locomotion	*Walking independently*
	Walking with orthotic aid, Wheel chair/tricycle

Following important domains of personal life were explored:-

1. Social including both initial meeting with others and friends

2. Sexual relationship

3. Personal adjustment

The responses recoreded were as under

Meeting others	*Easier*
	More difficult
	The same
Friends lost as a result of injury	
	More
	Less
	Same
Sexual implications	
Sexual relations	*Present*
	Absent
Feeling about self	*Positive*
	Negative
	No change

Observations

Most of the patients raporting to this study were partially recovered casas.

1. Most of the persons suffered spinal cord injury in their prime of life(46.6% in 30-44 yrs.) and 40% in 15-29 yrs.). In pediatric age group (0-14 yrs.) it was 4.4%, In Geriatric age group(60yrs. or more)it was 6.6%. This is because of restricted physical activities and limited outdoor life in both the age groups.

2. In this series 80% of the patients were males.And most of them suffered Injury due to their greater exposure to environmental and professional hazards.Male female ratio was 4:1 which is consistent with findings reported by other workers (Key and Retief,1970,Wilcox et al 1970).

3. In the present study almost one third of

the patients were 1-3 yrs. duration,27.6% were of quite long duration (4-9 yrs.)and one case was found to be of more than 10 yrs.duration.

4. Most common cause of injury was due to fall from height 66.6%. Road traffic accidents and fall of heavy object on the patient were next common cause for the injury in the present series.

5. Most common site for fracture were at thoracolumbar junction (42.2%) which is consistent with findings by Jefferson (Jefferson Cr 1927-28) and also by Calenoff and Chesare 1978).

6. Rural (73.3%) persons more often sustained spinal cord injuries than urban 26.6%.Similar findings were reported by other workers in India, Shanmugasundaram 1984, V. Chacko,B.Joseph, S.P. Mohanty 1986.

7. In 17.7% cases associated injuries were also present.

8. Associated injuries occured more commonly in cervical injuries in comparison to thoraco lumbar spine.In only one case multiple injuries were found.

9. 80% of patients were married at the time of injury.

10. Two patients were engaged at the time of injury,their engagement was broken later on from female side as they did not show any recovery.

11. Two cases got divorced after sustaining spinal cord injury.

12. 22.2% patients were farmers and 13.3% were labourers.

13. At the time of follow up study various changes were observed in work activity of spinal cord injuries patients as shown in Table no. 2.

20 patients (44.4%) were found to be unemployed after spinal cord injury.

14. Only three students could continue their studies after sustaining SCI.

15. None of the patients was found to do farming at the time of study. Out of 10 patients only three patients were able to supervise farming. Rest 7 patients were unemployed.

16. Out of 6 labourers only one was running a tea stall and rest five were unemployed.

17. Out of 2 semiskilled workers only one could continue the work. One was unemployed.

18. Only one patient who sustained spinal cord injury required assistance in grooming. The same case was dependent for eating and dressing activities.

19. Out of 45 patients 42 patients were able to manage their bladder independently and 39 patients were able to manage their bowel independently.

20. 37 patients out of 45 were independent in transfer activities.

21. Out of 45 patients only 24 patients 53.3% were walking independently.

22. The effect of injury on friendship varied in this series. Seventeen lost friends, five lost many friends and 23 claimed they had not lost any friends as a result of injury.

23. 20 patients out of 35 were having sexual relations with their partners.

Discussion

The extent and depth of disability caused by spinal cord injuries make it most devastating calamities in human life. The social stigma attached to it renders it most ugly face of human life. It must be dealt as a medical as well as a social problem.

Psychological Status

Depression is inevitable sequele of spinal cord injury disability, it removes the individual from normal social experience and from work places thus devoiding him from major sources of satisfaction and self esteem. When person is confined to wheel chair for rest of the life, his self image is shattered.

Loss of ability to perform sexual act and bladder bowel control adds to more psychological

Table No.1
Causes of Spinal Cord Injury

Aetiology	No. of cases	Percentage
Falls	30	66.6%
Road traffic accidents	8	17.7%
Weights (any heavy object falling on back)	7	15.5%
Total	**45**	**100**

Table No. 2
Type of Work done by SCI Patients before and after Onset

Aetiology	No. of cases		Percentage	
	before onset	after onset	before onset	after onset
Farmers	10	--	22.2%	--
Labourers	6	--	13.3%	--
Semiskilled workers	2	1	4.4%	2.2%
Skilled workers	5	5	11.1%	11.1%
Service	3	2	6.6%	4.4%
Shop	4	3	8.8%	6.6%
Supervisory work	--	3	--	6.6%
Housewife	8	7	17.7%	15.5%
Studying	6	3	13.3%	6.6%
Grazier	1	1	22.2%	2.2%
Doing nothing	--	20	--	44.4%
Total	**45**	**45**	**100**	**100**

Table No. 3
ADL Activity Ambulation

No. of cases					
Walking Independently	Walking with HKAFO	Walking with AFO	Using Wheel-chair	Using Tricycle	Lifing
24	1	8	4	1	7

problems. He needs time to evolve a new image of self. He remains so busy in integration process that no energy of motivation is left for him to think and plan for the future (Warde 1977: 10) the new image which he evolves for himself depends on his premorbid personality and on attitudes of those around him and opportunitites that come his way.

Community Support

From the time the patient is admitted to Rehabilitation centre the goal is to help him return to the community as soon as possible, functioning at his maximum potential. The indifferent attitude of family members or lack of opportunities and community support may turn even a strong personality into a bitter and frustrated individual.

Given the necessary community support however a paraplegic with a basically strong will power can once again become a well adjusted, socially and economically productive individual.

Until the recent past the rehabilitation of spinal injured did not attract much attention. With improvement in medical care the chances of survival of spinal injury patients through acute phase has increased. Now majority of patients do arrive at a stage where they no longer need medical care and are ready for rehabilitation within the community at large.

In our study age distribution of our patients are comparable with studies from other parts of the world. In the study by Philip Fine and Keith 1979-80, 54% cases were among persons between 15-29 yrs. of age and similar findings have been reported by Key and Retief, 1970, Guttmann 1976. In this age group persons are more exposed to dangerous occupations out side the home where they can sustain injuries.

The ratio between males and females was found to be 4:1 which is consistent with findings reported by other workers (Key and Retief 1970). This can be explained by greater involvement of male population in high risk jobs as compared to females.

The etiology of spinal injuries is diverse. Road traffic accidents are the major cause of spinal injuries in reported series from the western countries like in Keith and Fine study (1979-80) 42% of spinal injuries occurred due to road traffic accidents. Contrary to this, cause of spinal injuries in India are different.

Two thirds of the patients were from rural areas due to the fact that 75% population of India lives in the villages. The main causes of Spinal Cord Injury in India are different than western countries. The main cause in India is fall from height which was also reported by the Shanmugasundaram 1988, S.P Mohantey and T. Jacob.

The incidence of associated injuries is low in comparison to other studies reported by western workers like Guttmann in 1963 reported 28%, Meinecke 1968 reported 57.1%, Jodin et al 1984 reported an incidence of 76%.

Fracture of the long bones was found to be most commonly associated injury (17.7%). This may be because of etiological differences. In western countries motor vehicle accidents, sports injuries and violence are the main etiological factors.

Thoracolumbar spine being transitional zone between rigid thoracic spine and mobile lumbar spine is commonly injured area. 42.2% cases sustained injury around thoracolumbar junction. 3/4 of the patients were married at the onset of spinal injury. The same fact was also reported by Shanmugasundram in 1984. This is due to the fact that marriages in India take place at an early age.

Post spinal cord injury marriages were found in none of the cases. In our study and Madras project, divorce rate and separation was found negligible.

Out of 6 students only three could continue their studies.

Conclusions

Majority of patients sustained spinal injury in prime age of their life, majority being due to fall from height which is preventable by using safety measures.

Most patients belong to rural area where awareness of people towards safety measures is very low. Awareness can be increased by educating them to practice safety measured and emphasising that prevention is better than cure. Community support is negligible for spinal injury patients. To improve their social and economic status voluntary organisations should mobilise community resources and community based rehabilitation can prove more useful. More and more independent life style should be stressed so that they can become productive members of the society. Post spinal cord injury marriage was found in none of the cases. This indicates poor social acceptance of spinal injury patients.

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