

Post Polio Syndrome: Report of 3 Cases and Brief Review of Literature

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Abstract

Post polio syndrome, a well-recognised clinical entity now, has become a great challenge to the medical and surgical rehabilitation professionals, as more and more paralytic polio survivors age into fourth to sixth decades of their lives. Early diagnosis and timely rehabilitation of a person with post polio syndrome is important because at around this age one is just reaching the prime of one's productive life and starts consolidating socio-economic status of self and the family. There is paucity of literature or case reports on post polio syndrome from India. Here we report three cases of post polio syndrome in their forties and early fifties, attending outpatient rehabilitation programme. Their clinical presentation, rehabilitation management and outcome have been discussed. Diagnostic criteria and possible pitfalls in diagnosis in the light of available literature have been emphasised.

Key words: Paralytic poliomyelitis, post polio syndrome, fatigue, strengthening exercise, muscle, joint, ADL, ambulation.

Introduction

Following polio eradication measures on war footing through Universal Immunisation, "Pulse Polio" programme etc, the incidence of fresh cases has come down to practically zero. Studies¹⁻³ suggest that one-fourth to one-third of persons who had paralytic polio in the past may be experiencing post polio syndrome (PPS) at the present time. This proportion is likely to increase as these persons age into fourth to sixth decades of their lives with better health care services and

rehabilitation. At around this age one is just reaching the prime of one's productive life and starts consolidating socio-economic status of self and the family. That is how; PPS has become a great challenge to the medical and surgical rehabilitation professionals. Considering the age and stage of one's career, early diagnosis and timely rehabilitation of a person with PPS is very important. Here 3 cases are reported with brief review of literature to emphasise the need for high index of suspicion while dealing with post polio persons.

Case No 1

A 50 years old, male executive with a corporate entity and a known case of post polio residual paralysis (PPRP) since the age of three years, having involvement of right upper and left lower limbs. He presented with complaints of weakness in the sound right lower limb leading to difficulty in walking and more fatigability for 3 months before consultation in this OPD. He did not remember having weakness in the right lower limb previously. He also complained of difficulty in climbing stairs, performing self-care and personal hygiene (toileting) activities, which he was able to do previously. Before that, he was ambulatory without any aids or appliances. He had good muscle strength around shoulder and elbow on the affected side but poor in the hand. The left lower limb was flail. Quadriceps on the previously unaffected side (right lower limb) was found

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to be grade 3/5. He had got electromyography (EMG) studies done before reporting to us, which showed fasciculations and normal nerve conduction velocities (NCV) and was earlier labeled as motor neuron disease (MND). A repeat EMG study showed no fasciculations and normal NCVs. Magnetic resonance imaging (MRI) of dorso-lumbar spine was also done to rule out any spinal pathology but it was normal. Hence a diagnosis of PPS was arrived at and he was put on rehabilitation programme. He was given graded, non-tiring strengthening, power maintenance exercises, and a little modification in lifestyle in the form of breaking long tiring activities into smaller stages so as to avoid fatigue/exhaustion. After one month, he had started showing appreciable improvement and then at the end of a year and a half follow-up he had got his right quadriceps improved to 4/5. The patient, however, did not show much of improvement in his activities of daily living (ADL).

Case No 2

The second case was a 54 years old, male hospital employee. He was a known case of PPRP since early childhood, having flail left lower limb with normal upper and right lower limbs. He was independent in ambulation without any aids or orthotic support. He sustained fracture of left tibial condyle (polio affected side) two years ago for which he was immobilised in plaster of Paris (POP) cast and confined to bed for eight months. After removal of plaster, he continued to be on prolonged rest. This resulted in a flexion contracture of left knee and fresh weakness in the right lower limb following deconditioning. After correction of the flexion deformity of the knee by stretching, he was fitted with left knee ankle foot orthosis (KAFO) since he could not manage to walk as he did prior to injury with trick movements balancing on the left lower limb while walking and ambulated with bilateral crutches. The acceptability to the orthosis was poor. After much persuasion and counselling, he put on the caliper. However, he was still unable to stand and walk due to added weakness in the right lower limb (contralateral side) with power in the right knee extensors to around 3. In addition, he had serious psychosocial problems as well, being single and deserted by the brother and sister-in-law. He lost self-confidence and was never sure of attaining the same pre-injury functional status. He also became depressed and started harbouring suicidal tendencies. Despite a lot of counselling from clinical psychologist and even psychiatric intervention he refused to return to

work and finally abandoned the job. Ultimately he resorted to begging on tricycle. He used to roam in open and sleep on the road only, wherever and whenever he felt like. One fine morning he was found dead on the roadside.

Case No 3

The third case was a 48 years old housewife and engaged in desk job in an office. She was a known case of PPRP since the age of 5 years having involvement of both the lower limbs. She presented with complaints of extra weakness and fatigability noticed, during the last few months. She had started feeling difficulty in walking, was unable to climb the bus and stairs. Over the period she became even unable to walk and had to take leave from her job leading to further disuse and de-conditioning. The problems used to be more pronounced towards the afternoon and evening. She was ambulatory without any aid or appliance for more than thirty years before the onset of these problems and used to go to her office on foot and by city bus. On examination her muscle power in both the lower limbs was in the range of 2 to 4 with antigravity muscles being >3. She was advised non-fatiguing endurance enhancing exercises and to use crutches. After 8 weeks on this regimen she could regain her pre morbid functional status and resumed attending her office, of course, with crutches added as an aid.

Discussion:

There are many terms given to the problems faced by post polio patients. These include “late-onset poliomyelitis progressive muscular atrophy,” “late progressive post poliomyelitis muscular atrophy,” “late post poliomyelitis muscular atrophy,” “progressive post polio atrophy” and “progressive post poliomyelitis muscular atrophy”⁴⁻⁸. The empirical research data is lacking that can indicate progressive atrophy or rapid decline in strength hence the term “**post polio syndrome**” has been agreed upon universally to better describe the complaints and findings of polio survivors and does not make unfounded presumptions. PPS is essentially a diagnosis of exclusion⁹ and can be arrived at through the following diagnostic criteria.

Post Polio Syndrome: Diagnostic Criteria

1. A confirmed history of paralytic polio.
2. Partial to fairly complete neurologic and functional recovery.
3. A period of neurologic and functional stability of at least 15 years duration.

4. Onset of two or more of the following health problems since achieving a period of stability:
 - i. Unaccustomed fatigue.
 - ii. Muscle and/or joint pain.
 - iii. New weakness in previously affected or unaffected muscles.
 - iv. Functional loss.
 - v. Cold intolerance.
 - vi. New atrophy.
5. No other medical diagnosis to explain these health problems.

The last criterion is very important and calls for a high index of suspicion on clinician's part while dealing with a post polio person. The second case had a clinical condition of fracture on the affected side which was duly treated. However, his continued rest perhaps led to apparent deconditioning and probably fresh weakness on the contralateral side due to post polio syndrome. Assigning the tag of post polio syndrome in this case won't be wrong since the disuse atrophy usually does not get that worse. Had it just been disuse atrophy, it would have affected all the muscle groups in the contralateral lower extremity than just quadriceps being affected mainly. Moreover, the right quadriceps had been subjected to years of overuse since he had not been using any orthotic support on flail left lower limb nor any walking aid for so many years. This might have surfaced up relatively rapidly due to post polio syndrome when the patient was not performing the walking and other day to day activities. This probably added to his going into depression and withdrawal from the ADL and work activities, leading to the painful period, prior towards the end to his life. Despite his being a hospital employee getting all the rehabilitation help, he could not come out of the situation and was a failed case of rehabilitation.

In all the three cases reported, routine haemogram, liver and renal function tests, blood sugar profiles and urine exams were done to rule out other likely diagnoses to explain these problems. Frequent clinical diagnoses given to such patients include muscle pain related to over-activity, overuse or myofascial pain, joint pain related to arthritis or mechanical problems in joints less well protected by weakened muscles. In 3 large patient series⁹⁻¹¹, frequently encountered complaints in these patients included fatigue (86-89%), muscle pains (71-86%), joint pains (71-79%), weakness in previously affected muscles (69-89%) and in unaffected muscles (50-77%). Other complaints also included^{9,11} cold intolerance (29 and 56%) and atrophy (28 and 39%).

The common ADL complaints included,^{9,10} problems in walking (64-85%), stair climbing (61-83%)⁹⁻¹¹ and dressing (16-62%)⁹⁻¹¹.

Rehabilitation Management:

The treatment of PPS is based on evaluation of the individual situation. No two such cases are same in respect of symptomatology, severity and extent of involvement and in other demographic and socio-vocational aspects. Fatigue is a common problem. The cause of this complaint may be unknown or central in origin in at least some of the patients. Halstead and Rossi¹⁰, in a survey of 539 polio survivors, reported that complaint of fatigue was significantly relieved by increasing the rest time, napping or reducing the overall activity level through the day. The most frequent rehabilitation interventions advised to PPS patients in two large series^{9,11}, included new or modified aids (87%)⁹, that included durable products used to improve posture, diminish pain and enhance comfort, like corsets, lumber rolls, neck pillows, wheelchair positioners, canes and crutches. Other prescribed measures included, energy conservation techniques (64 and 73%), change in exercise programme (64%), change in orthoses (52 and 34%), weight loss (52 and 27%), new/ modified wheelchair (26%), gentle exercise programme¹¹, comprising aerobic (23%), stretching (46%) and strengthening (43%) exercises.

In addition to these measures almost all patients received counselling on the need to reduce stress in their lives—both physical as well as emotional⁹. Psychological counseling or participation in a post polio support group to learn new coping skills was also recommended for many patients¹¹.

The role of exercises on PPS patients has been found controversial in the past. Some of the early studies^{12,13} showed beneficial effects of strengthening exercises while others reported that vigorous exercise and activity were detrimental¹⁴⁻¹⁷. However, a number of recent studies on effects of muscle strengthening exercises¹⁸⁻²¹, general exercises or aerobic fitness training^{22,23}, efficiency of movement²⁴ and on aquatic exercises²⁵ reveal that it is the individualised and judicious exercise programme that is beneficial. It is found that that antigravity muscles and/or muscles having greater strength on manual muscle testing²⁶ can tolerate strengthening exercises¹⁸⁻²¹. Swimming and aquatic exercise may prove to be one of the best types of exercise in these persons as the buoyancy of the water reduces

the effect of gravity on the patient's joints and limbs protecting them from overuse. The benefits can be seen in the form of improved muscle strength, cardio-respiratory fitness and the efficiency of ambulation in post polio patients. Achievement of benefits is further subject to avoidance of excessive fatigue and muscle and joint pains.

The main problem in prescribing any rehabilitation strategy lies in the uniqueness of each post polio patient. The physiatrist needs to make out patient-specific circumstances, including the location and degree of muscle weakness and that of subsequent arthralgia or arthropathy. Any rehabilitation programme should be aimed at protecting the involved joints and weakened musculature from overuse and the remaining joints and muscles that can withstand greater stress from disuse. Physiatrist has to strike a judicious balance of strengthening and reconditioning programme without tiring out the weaker muscles and stressing the joints. Deconditioning like leave from job, excessive rest at home should never be promoted as in second and third cases.

Rehabilitation Outcome

Compliance on part of the patient to clinical advice, made after physiatric evaluation, appears to be a crucial factor in determining outcome of the rehabilitation programme. Agre *et al*¹¹ reported improvement in 78% cases seen in follow-up while those who did not show any improvement were not compliant to the recommen-

dations. Peach and Olejnik²⁷ also reported significant improvement in compliers out of 77 patients group divided into three groups of compliers, partial compliers and non-compliers. Four common symptoms, weakness, fatigue, muscle and joint pains were studied in this series. Nearly 100% of the complier group showed resolution or improvement in symptoms while nearly 100% of the non-complier group landed in no-change or increased symptoms category in these 4 symptoms. Patients, from partial complier group, were mostly in improvement category with significant minority in no-change category. This study concluded that patients who completely comply with clinical recommendations and could successfully control the factors responsible for the neuromuscular overuse did not lose muscle strength and had considerable improvement in symptoms. The results are summarised in Table 1.

Conclusions:

In all the three cases, it was noticed that fresh weakness and ADL problems cropped up in an otherwise settled life of a post polio survivor. Physiatrist has to be on guard to the possibility of PPS and avoid advising more than necessary rest from daily routine. Disuse further promotes weakness in PPS. At the same time exercise programme has to be tailored and customised for each individual patient to promote strengthening of involved muscles in such a way so as to prevent undue fatigability. Judicious exercise mix in the appropriate postpolio patient (the patient who can exercise and avoid undue

Table 1: Symptom Status of Post Polio Patients at the Time of Follow-up (Average 2 years)

Group and problems	No of cases	Resolved	Improved	No change	Increased
Complier group	30				
Weakness	23	17%	83%	0%	0%
Fatigue	28	4%	96%	0%	0%
Muscle pain	25	28%	72%	0%	0%
Joint pain	17	1%	53%	6%	0%
Partial complier group	32				
Weakness	29	0%	79%	21%	0%
Fatigue	31	0%	68%	29%	3%
Muscle pain	32	3%	88%	9%	0%
Joint pain	24	4%	83%	13%	0%
Non-complier group	15				
Weakness	14	0%	0%	64%	36%
Fatigue	14	0%	0%	64%	36%
Muscle pain	14	0%	14%	57%	29%
Joint pain	11	0%	0%	82%	18%

fatigue, muscle pain and arthralgia) is an important adjuvant to patient's overall therapeutic programme²⁸. In addition, taking care of the psychosocial problem form an integral component of any successful rehabilitation programme, where we failed in the second case.

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