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Salvage procedures in post-polio residual paralysis (PPRP) with or without arthritis

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Abstract

Poliomyelitis is a rare disease at present, but presentation with its sequelae is not uncommon. In this study we are presenting 5 different cases with 5 different deformities in lower limb, who were managed with arthrodesis, tendon transfer, and osteotomies in combination. All the 5 patients were satisfied with their gait and pain relief after surgery compared with pre-operative status. All patients were followed for period of 2 years post operatively, no major complications were encountered. In conclusion, because of gross muscle power compromise replacement surgeries will not give good results in post residual paralysis patients, so salvage procedures definitely improve the performances of patients with painful unstable joints.

Keywords: knee arthrodesis, hamstring transfer, pelvic supportive osteotomy (PSO), grice-green subtalar arthrodesis

Introduction

Polio though supposed to be extinct now, India constituted over 60% of all global polio cases as recently as 2009. The last case of polio was 18 months old baby paralyzed by polio in January 2011. However, in 2014, India was officially declared polio-free, along with the rest of the South-East Asia Region.

The presence of virus in sewage samples collected from Hyderabad has imposed a vital challenge to WHO's March 2014 declaration "India a polio-free nation" [1, 2].

While the incidence of new cases has been remarkably reduced, the availability of immunization has no effect on those who already have had the disease [3].

These children are now mostly late teenagers and adults. The treatment of post polio residual deformities is now mostly an adult problem.

Good manual muscle evaluation skills need to be relearned. A muscle usually loses one full grade when transferred. Therefore to be functionally useful a grade of at least 4 is necessary. However, a grade 3 muscle, while unable to provide a useful function after transfer, may be effective in preventing deformity by better balancing forces about a foot or hand [4].

Reconstruction in the lower extremities is somewhat different than in the upper extremities, at least to the extent that in the lower extremities it is more important to have strong muscles proximal ward while in the upper extremities the joints distal ward -wrist, hand and fingers-are the most important [5].

Described are the cases of post polio residual paralysis with various degrees of lower involvement.

Methodology

This is retrospective study of 5 Patients admitted in teaching Hospital between 2016 -2019.

Aim

To know the efficacy of various salvage procedure in lower limbs with post-polio residual paralysis.

Inclusion criteria

patients with history of polio myelitis, isolated lower limb involvement with or without arthritis.

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Exclusion criteria

Neuropathic joints / flail joints of other pathology like Myelo-Meningocele (MMC) were excluded.

Post op Patients were monitored for Pain relief and improvement in gait.

Case 1: Flail right knee with arthritis- knee arthrodesis.

A 28 Years old women with arthritis knee with poor quadriceps function, was operated by doing knee arthrodesis, with 5 degree of valgus and 10 degree of flexion. Patient was followed for 10 weeks, and she attained good pain relief with stable knee, able to walk with stick, with no hand knee gait.



Fig 1A-C, Case 1, A, Pre-op X-ray. B, Immediate Post op X-ray with implants. C, Post op x-ray after implant removal.

Case 2: Left knee quadriceps paralysis-Hamstring transfer. (6)

A 22 years female presented left knee quadriceps power 0/5 and Left hamstrings power 4/5, there is no arthritis of knee and with right knee full extension. Hamstrings transfer was done, medially semi tendinosis and laterally biceps femoris

were reinserted over patella creating intra osseous tunnel, above knee cast was given for 6 weeks with 30-degree flexion. Post procedure patient had stable knee, with no hand knee gait, there was extension lag of 20-degree, patient could flex her limb completely. There was 20-degree extension deficit after vigorous physiotherapy.



Fig 2: A-C, Case 2, A, Preop in standing, B, Pre-op Left knee quadriceps with zero function, C, Intra op

Case 3: Right hip arthritis-Pelvic supportive osteotomy (PSO).

A 34 Years old man, with arthritis right hip had fixed flexion deformity of 30 degree. He was unable to squat and sit on ground. Pelvic supportive osteotomy (PSO) was done with head of femur excision, valgus osteotomy of proximal femur

was done with 40 degree of angulation. In follow up patient had moderately stable hip and pain free limping gait but patient had limb shortening by 4 inches and unable to run and brisk walk, refused for limb lengthening procedure and managed with heel rise footwear.



Fig 3: Case 3, A, Pre-op X-ray. B, Immediate Post op X-ray with implants

Case 4: Calcaneo-valgus deformity –Grice-Green Subtalar arthrodesis.

A 25 years female presented with Calcaneo valgus feet and Subtalar instability with no arthritic changes. sub talar arthrodesis (grice green) was done in lateral approach, sinus

tarsi was exposed and trough created, fibular graft was placed (in maximum Varus of sub talar joint) Below knee cast was applied. Post op patient was mobilized after 6 weeks. There was Sub talar joint fusion, patient had stable stance with no valgus at sub talar joint.



Fig 4: Case 4, A, Pre-op Clinical picture. B, Post op Clinical picture C, Post op X-ray

Case 5: Flail knee with hyper extension deformity - corrective osteotomy with hamstrings transfer. (7)

30 years women with hyper-extended knee and hand to knee gait, had poor quadriceps function. Power of quadriceps is 2/5 and that of hamstrings is 4/5. Corrective osteotomy of distal

femur and hamstring transfer to patella was done. Post op, patient had improved quadriceps function with power of 4/5, and hand knee gait also improved. Patient could walk without support.



Fig 5: Case 5, A, Pre-op Clinical picture. B, Post op X-ray C, D, Post op Clinical pictures

Results

In all the above 5 cases arthritic pain improved, muscle imbalance improved, and gait also improved. All the patients had good wound healing with no delay in union of osteotomy or arthrodesis. In all patient's tendon transfer started acting after 2 months with physiotherapy.

Discussion and conclusion

Though polio is extinct disease now, PPRP are still present in community. The arthritis develops early in PPRP limbs/joints. It is due to altered weight transmission. Arthroplasty is not possible in such cases due to altered anatomy and muscle power. The treatment in arthritic joints in flail limb is either arthrodesis or interposition procedures. The remaining tendons are very important, they need to check cautiously. Tendon transfers are effective treatment options in patient with non-arthritic limb. Though the normal effective activity is not possible but the salvage procedures definitely improves the performances of patients.

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