ORIGINAL RESEARCH

Assessment of triple arthrodesis for equinovarus foot using Ilizarov technique

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ABSTRACT

Background: The foot deformity known as equinovarus may be acquired or congenital. The present study was conducted to assess triple arthrodesis for equinovarus foot using Ilizarov technique. **Materials & Methods:** 40 patients with equinovarus foot deformity of both gendersunderwent gradual deformity correction and triple fusion with Ilizarov fixator. Foot was assessed for any residual deformity and shortening. Functional outcome was assessed by Ankle Hind Foot Scale (AHFS) and patient satisfaction using likert scale. **Results:** Out of 40 patients, males were 22 and females were 18. Side was right in 16 and left in 34 patients. Diagnosis was spina bifidain 18, syndromic clubfoot in 12, Talo-calcaneal coalition in 3, recurrent clubfoot in 4, mirror foot in 2 and post- polio residual paralysis in 1 patient. AHFS preoperative was 72.5 and postoperative was 83.6. Likert score preoperative was 4 and postoperative was 7.5. The difference was significant (P< 0.05). Common complications was supramalleolar fracture tibia in 2, pin tract infection in 1 and calcaneocuboid non- union in 3 cases. The difference was significant (P< 0.05). **Conclusion:** Equinevarus foot deformity can be effectively managed with triple arthrodesis combined with progressive correction using the Ilizarov procedure. It more precisely aligns the foot and corrects deformities, which increases patient satisfaction.

Keywords: foot deformity, equinovarus, Ilizarov technique

INTRODUCTION

The foot deformity known as equinovarus may be acquired or congenital. It is made up of structural problems and/or muscle imbalances that impair foot function.[1] Congenital Talipes Equinovarus (CTEV), which is typified by plantar flexion of the ankle, inversion of the rear foot, and adduction of the forefoot, is the most identifiable congenital type.[2] With a male to female ratio of 2:1, the global prevalence of CTEV (clubfoot) is 1 to 2 per 1000 live births. There are two other classifications for congenital clubfoot deformities: idiopathic and non-idiopathic (syndromic).[3] A neurogenic cause (spina bifida, sciatic nerve injury, polio, cerebral palsy), a vascular cause (ischaemic contracture, paralysis), muscular dystrophy, tibial hemimelia, or as a result of an infection, accident, or burn can all result in the development of an acquired Equinovarus foot deformity. Even with a great deal of effort and a substantial body of orthopedic research devoted to the diagnosis and treatment of these deformities, it is still a major issue for teenagers and presents numerous treatment obstacles.[4]

An effective palliative method for treating adults and adolescents with equinovarus deformity is triple arthrodesis. The union of the talonavicular, calcaneocuboid, and subtalar joints makes up this condition. While it can be a helpful treatment for complex clubfoot deformities in teenagers, it has numerous drawbacks when used for severe deformity repair.[5]Known complications include wound disintegration, infection risk, and the use of internal implants. Acute deformity repair may increase the risk of stretch injury to nearby neurovascular systems.The potential of malunion, overcorrection, and residual deformity following a procedure can be symptomatic and require revision surgery.[6]The present study was conducted to assess triple arthrodesis for equinovarus foot usingIlizarovtechnique.

MATERIALS & METHODS

The present study was conducted on 40 patients with equinovarus foot deformityof both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients underwent gradual deformity correction and

triple fusion with Ilizarov fixator. Foot was assessed for any residual deformity and shortening. Functional outcome was assessed by Ankle Hind Foot Scale (AHFS) and patient satisfaction using likert scale. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 40		
Gender	**Male**	**Female**
Number	22	18

Table I shows that out of 40 patients, males were 22 and females were 18.

Table II Assessment of parameters

Parameters	Variables	Number	P value
side	Right	16	0.01
	Left	34	
Diagnosis	Spina bifida	18	0.02
	Syndromic clubfoot	12	
	Talo-calcaneal coalition	3	
	Recurrent clubfoot	4	
	Mirror foot	2	
	Post polio residual paralysis	1	
AHFS	Preoperative	72.5	0.05
	Postoperative	83.6	
Likert score	Preoperative	4	0.05
	Postoperative	7.5	

Table II shows that side was right in 16 and left in 34 patients. Diagnosis was spina bifida in 18, syndromic clubfoot in 12, Talo-calcaneal coalition in 3, recurrent clubfoot in 4, mirror foot in 2 and post- polio residual paralysis in 1 patient. AHFS preoperative was 72.5 and postoperative was 83.6. Likert score preoperative was 4 and postoperative was 7.5. The difference was significant (P< 0.05).

Graph I Assessment of parameters

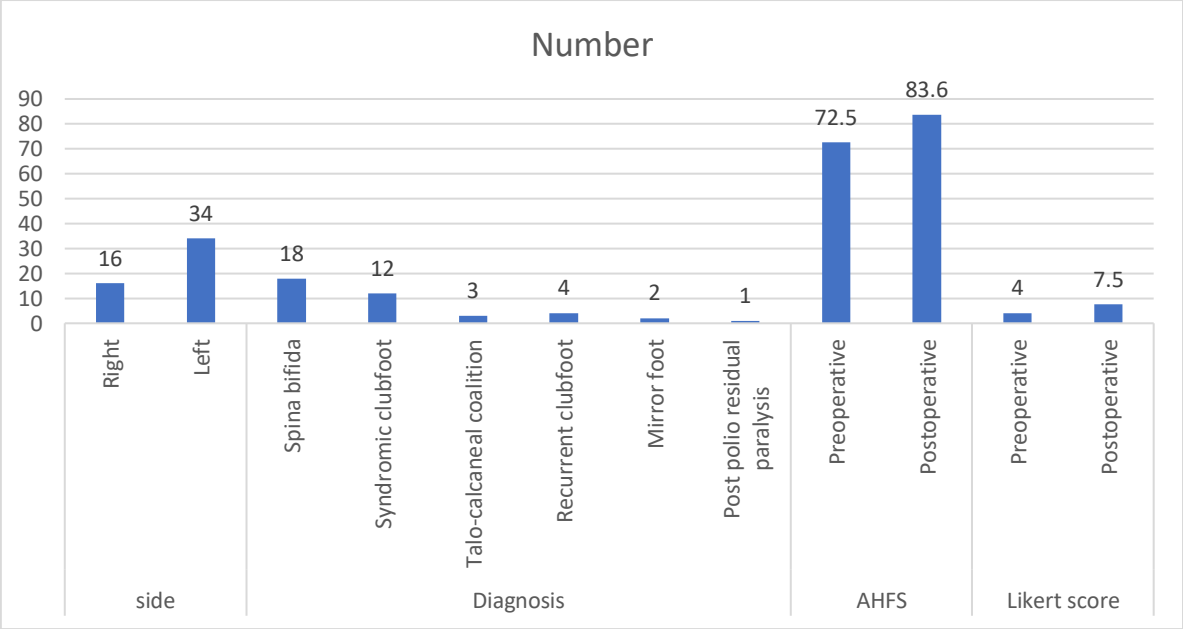

Table III Complications

Complications	Number	P value
Supramalleolar fracture tibia	2	0.49
Pin tract infection	1	
Calcaneocuboid non union	3	

Table III shows that common complications was supramalleolar fracture tibia in 2, pin tract infection in 1 and calcaneocuboid non- union in 3 cases. The difference was significant (P< 0.05).

DISCUSSION

The Ilizarov approach has gained popularity as a less invasive treatment option for children with neglected, relapsing, and resistant clubfoot, either in conjunction with or without soft tissue and bone treatments.[7,8] It permits progressive simultaneous correction of deformities in all planes without unduly stretching soft tissue structures such as the neurovascular system.[9]Significantly fewer wound healing issues arise, and constant manipulation during the postoperative phase enables more precise alignment restoration.[10]The present study was conducted to assess triple arthrodesis for equinovarus foot using Ilizarov technique.

We found that out of 40 patients, males were 22 and females were 18. Pandey et al[11]studied the effectiveness of triple arthrodesis, performed with Ilizarov technique for equinovarus foot deformity in adolescents and adults and evaluated the early functional outcome and patient satisfaction rate for this procedure. Twelve males and eight females with mean age of 15.9±3.4 years fulfilled the inclusion criteria and were included for final analysis of results. Fusion rate was 86.1% with mean union time of 12.5 weeks. Mean AHFS improved from 61.27 before surgery to 76.9. One or more complications were seen in 15 (68.1%) feet but were managed satisfactorily without any significant impact on final outcome. Patient satisfaction rate for the procedure was 80%. After a mean follow-up of 18.1 months, plantigrade foot with equal foot length was obtained in all patients.

We found that side was right in 16 and left in 34 patients. Diagnosis was spina bifida in 18, syndromic clubfoot in 12, Talo-calcaneal coalition in 3, recurrent clubfoot in 4, mirror foot in 2 and post- polio residual paralysis in 1 patient. AHFS preoperative was 72.5 and postoperative was 83.6. Likert score preoperative was 4 and postoperative was 7.5. Vlachou et al[12]evaluated 38 patients who had a total of 52 triple arthrodeses. The average age at the time of operation was 14.2 years and the mean followup period was 10.2 years. Results were rated good in 17 feet, fair in 28 and poor in 7. Talonavicular pseudarthrosis was observed in two feet, residual varus deformity in four, residual valgus deformity in one, wound infections in two, and wound haematomas in six. Better results were observed in cavovarus and planovalgus foot deformity, whereas poor results were especially seen in rigid equinovarus, calcaneoplanovalgus and equinoplanovalgus deformity.

We found that common complications was supramalleolar fracture tibia in 2, pin tract infection in 1 and calcaneocuboid non- union in 3 cases. de Groot et al[13]studied patients who received triple arthrodesis for OA. On the Ankle-Hindfoot Scale, twenty-two patients, or sixty-one percent of the patients, received a satisfactory overall score. Of the patients, 47% exhibited radiographic OA of the tibiotalar joint, and 19 patients (53%) were satisfied with the outcome of the procedure. Ankle-Hindfoot Scale score and male gender were found to be substantially correlated with radiographic OA in a univariate regression analysis. A higher score on the was substantially correlated with patient satisfaction.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that Equinevarus foot deformity can be effectively managed with triple arthrodesis combined with progressive correction using the Ilizarov procedure. It more precisely aligns the foot and corrects deformities, which increases patient satisfaction.

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