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Comparison of Long Term Results of Two Surgical Techniques In Pes Equinovarus Treatment

Pes Equinovarus Tedavisindeki İki Cerrahi Tekniğinin Uzun Dönem Sonuçlarının Karşılaştırılması

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ABSTRACT

Objective: Surgical treatment of pes equinovarus (PEV) is sometimes a necessity for patients that do not respond to conservative treatment. This study aimed to compare the long term functional and radiographic results of Posteriomedial release (PMR) and Complete subtalar release (CSTR) techniques.

Materials and Methods: We evaluated 84 feet of 59 (45 boy and 14 girls) patients who underwent surgical treatment (Posteromedial release and subtalar release) for PEV. The mean follow-up period was 94.7 months (7.83 years). The functionel assessment was made according toLaaveg-Ponseti functional scoring system and the radiographic evaluation was made by using the anteroposterior talocalocaneal angle , lateral talocalocaneal angle and talus-first metatarsal angle. Bimalleolar angles were measured.Turco incision was used for both techniques. Pearson Chi Square was used for statistical analysis. This study was made by the B.30,2ATA.0.01.00/87 numbered permission of ethical committee of Atatürk University.

Results: Functional results were excellent in 62.6% of feet, good in 2.3% of feet, fair in 22.3% of feet, and poor in 2.8% of feet that underwent CSTR. Functional results were excellent in 44.8% of feet, good in 33.8% of feet and fair in 21.4% of feet that underwent PMR. None of the patients were assessed as poor that underwent PMR.There were statistical significant differences between the two surgical procedures with respect to functional scores and complications ($p<0,05$).

Conclusion: Better functional outcome and less complications are seen in CSTR.Turco incision may be sufficient for lateral subtalar release.

Keywords: PEV, surgical treatment, long term results.

ÖZET

Amaç: Konservatif tedaviye cevap vermeyen hastalarda pes equinovarus (PEV) cerrahisi alternatif bir tedavi yöntemidir. Bu çalışmamızda Posteriomedial gevşetme (PMR) ve Komplet subtalar gevşetme (CSTR) tekniklerinin uzun dönem fonksiyonel ve radyolojik sonuçlarının karşılaştırılması amaçlanmıştır.

Yöntem: Pes ekinovarus olgularında kliniğimizde yapılan cerrahi tedavi (Posteromedial gevşetme ve komplet subtalar gevşetme) sonuçlarının karşılaştırılması amacıyla 59 hastanın 84 ayağı değerlendirildi. Hastaların 45'i erkek 14'ü kız çocuklarıydı.Takip süresi ortalama 94,7aydı (7.83 yıl).Postoperatif olarak hastaların fonksiyonel değerlendirilmeleri Laaveg-Ponseti fonksiyon değerlendirme skoruna gore yapıldı. Hastaların radyolojik değerlendirilmeleri ise anteroposterior ve yan talokalkaneal açılar, talus 1.metatars açısı ile yapıldı. Ayak bimalleolar açıları ölçüldü.Her iki teknikteTurco insizyonu uygulanmıştır.İstatistik değerlendirmede Pearson Ki karekullanılmıştır. Bu çalışma Atatürk Üniversitesi etik kurulunun B.30,2ATA.0.01.00/87 sayılı izni ile yapılmıştır.

Bulgular: CSTR yapılan ayakların % 62,6'sı mükemmel, % 2,3'ü iyi, %22,3'ü orta ve %2,8'i kötü olarak değerlendirildi. PMR yapılan ayakların %44,8'I mükemmel, %33,8'i iyi ve %21,4'ü orta olarak değerlendirildi. PMR yapılan hiç bir hastada kötü sonuç alınmadı.Sonuç olarak CSTR ve PMR teknikleri arasında fonksiyonel ve komplikasyon sıklığı yönünden İstatistiksel olarak anlamlı fark bulundu ($p<0,05$).

Sonuç: CSTR yapılan hastalarda uzun dönem fonksiyonel sonuçlar daha iyi ve komplikasyon görülme oranı daha düşüktür. Turco insizyonu her iki teknik için kullanılabilir.

AnahtarKelimeler: PEV, cerrahi tedavi, uzun dönem sonuçlar.

INTRODUCTION

PEV is a complex foot deformity that is estimated to occur in one of every 1000 live births. Equinism, adduction of forefoot and varus are the three main components(1-4). The treatment of PEV has shifted over the years. Although surgical treatment was popular at first, nowadays it is suggested that conservative treatments have better long term results. Conservative methods are based on the principle of elongation of contracted connective tissues (5-10). Although conservative methods are suggested as the initial treatment some cases can not be corrected completely and surgery is required. Clinical and radiographic examinations for determining residual deformities are essential preoperatively. The technique of the surgery is decided according to the age of the patient and the degree ofresidual deformity. Therefore pathoanatomy of the deformity should be well known by the surgeon (5,11).

Surgery of PEV has a wide spectrum that includes posterior release, achillotomy, tendon transfers and extensive surgical dissections like complete subtalar release and posteriomedial release.

MATERIALS AND METHODS

Surgical procedures were performed to the patients that do not heal by conservative methods. We have retrospectively evaluated 84 feet of 59 patients (14 girls, 45 boys; mean age 8.5 months) who underwent CSTR or PMR for congenital PEV. Involvement of the disease was 59.5% (50 feet) bilateral, 17.9% (15 feet) left and 22.6% (19 feet) right . Surgical dissection included complete subtalar release in 48 feet (57.1%), and posteromedial release in 36 feet (42.9%). The patients were assessed according to the Laaveg-Ponseti functional scoring system, foot bimalleolar angle, and other radiographic measurements.The mean follow-up period was 94.7 months (7.83 years, 24-336 months) (Table 1).

Figure 1: View of patient that underwent CSTR. Excellent functional score eight years postoperatively.

Figure 2: Posterior view.

In our cases we prefer to use the posteromedial incision that has been described by Turco (14). We can also apply lateral release through the same incision but in some cases we make a 2 cm long lateral incision to release the lateral of subtalar joint.

The patients were assessed with the Laaveg-Ponseti functional scoring system postoperatively (5). 40 points for patients satisfaction, 30 points for pain and 30 points for physical excamination were evaluated.

Radiographic excamination were made by using anteroposterior talocalcaneal, lateral talocalcaneal and talus -first metatarsus angles. We have also evaluated bimalleolar angle postoperatively.

RESULTS

Functional results were excellent in 58 (69%) feet, good in 18 (21.4%) feet, fair in 7 (8.3%) feet, and poor in one (1.2%)

Figure 3: Lateral X ray.

Figure 4: Anteroposterior X ray.

Table 1: Demographic features of the patients.

Sex	Number	%
Boy	45	76.2
Girl	14	23.8
Total	59	100
Affected Foot		
Right	19	22.6
Left	15	17.9
Bilateral	50	59.5
Total	84	

	Minimum	Maximum	Mean
Operation Age (month)	3	36	8.5
Follow Up (month)	23	336	94.7

Table 2: Functional results for each technique.

Technique	Excellent %	Good %	Fair %	Poor %
CSTR	62.6	12.3	22,3	2.8
PMR	44.8	33.8	21.4	0

foot.The poor result was seen in the CSTR group. In CSTR group; 62.6 % of feet were excellent, 2.3 % good, 22.3 % fair and 2.8 % was poor. In PMR group; 44.8 % of feet were excellent, 33.8 % good, 21.4 % were fair. There was significant statistical difference between the two surgical procedure ($p< 0.05$). Patients who underwent CSTR had better functional results (Table 2).

Complications were seen in 15 (17.9 %) feet such as metatarsus adduktus, cavus and pes planus. Complication were seen in 5 (10.4%) feet of CSTR group and 10 (27.8%) feet of PMR group. This difference was statistical significant ($p< 0.05$).

In CSTR group according to bimalleolar angle; 37 (77,1%) feet were Tip 1, 10 (20,8%) feet Tip 2 and one (2,1%) foot was Tip 3. In PMR group 28 (77,8%) feet were Tip 1, 7 (19,4%) were Tip 2 and two (2,8%) feet were Tip 3.

Functional scores weresignificant correlated with the foot bimalleolar angle, talus-first metatarsus angle and with the talocalcaneal angle on lateral radiographs ($p<0.05$) (Table 3 Figure 1,2,3,4).

DISCUSSION

The main aim of PEV treatment is to obtain flexible, plantigrad, painless and strong feet. Therefore maintenance of reduction of talocalcaneonavicular dislocation or subluxation is necessary for remodelling normal anatomy of joints (15).

Respectively conservative treatment and surgery were popular in past years. Nowadays the current treatment is the conservative treatment method of Ponseti. Although conservative treatment is getting popular, surgery is the treatment for the patients that do not respond to conservative methods.

Halanski et al. suggested that one of the first controlled, prospective studies comparing the results of the Ponseti method to surgical treatment for patients with PEV deformities shows lower surgical rates and fewer revision surgeries with the conservative technique (16). Bridgens and Kielyreported better long term results of conservative methods comperative to surgery (17). Simultaneous correction of all deformities should be obtained at the same operation, if not fibrosis and atrophy causes difficulty in each operation (11).

Different incisions have been described for PEV surgery. Each of them have advantages and disadvantages. Cincinnati incision (12,13) allows wide view of anatomic structures and has better cosmetic results. But it may cause wound necrosis and dissection of Achilles tendon may be difficult.

Publications report different results of long term results of surgeries. Deniz et al. (18) evaluated the long-term functional and radiographic results (mean follow up was 9,8 years) of patients who underwent extensive soft tissue dissection and suggested that extensive surgical dissection enables simultaneous correction of all components of deformity and provides satisfactory results not only in the short-term but also in the long-term outcome. Matthew Dobbs et al. (19) reported a study which mean follow up was 30 years that many patients with PEV treated with an extensive soft-tissuerelease have poor long-term foot function with correlation between the extent of the soft-tissue release and the degree of functional impairment.Repeated soft-tissue releases can result in a stiff, painful,and arthritic foot and significant impaired quality of life.

Radiographic evaluation were made by using anteroposterior talocalcaneal, lateral talocalcaneal and talus -first metatarsus angles. Functional scores were significant correlated with the talus-first metatarsus angle and with the talocalcaneal angle on lateral radiographs. Turco and Ponseti reported that lateral talocalcaneal angel as the most important radiographic measurement postoperatively compatible just like our study. Kalenderer et al. suggested that clinic results are more satisfactory

Table 3: Distribution of foot bimalleolar angle, talus -1st metatarsal angle and lateral talocalcaneal angle results according to surgical procedures.

	PMR		CSTR	
	Number	%	Number	%
Foot bimalleolar angle				
Type 1 (75°- 85°)	28	77.8	37	77.1
Type 2 (70°-74°)-(86°-90°)	7	19.4	10	20.8
Type 3 (65°-69°)-(>90°)	2	2.8	1	2.1
Type 4 (<65°)	-	-	-	-
Talus-first metatarsal Angle				
0°-(-20°)	31	86.1	45	93.8
<-20°	5	13.9	5	13.9
Lateral talocalcaneal angle				
25°-60°	26	72.2	33	68.8
>60°	10	27.8	15	31.3

than radiologic results in patients that underwent CSTR (20).

Foot bimalleolar angle is an objective, practical and effective method that can be used for preoperative classification and postoperative evaluation. Jain measured bimalleolar angle as 82.5 in healthy Indian children (21). Functional scores were significantly correlated with the bimalleolar angle.

In conclusion orthopaedic surgeons should not avoid from surgery for patients that do not respond to conservative methods. In our study we found better functional results and less complications in CSTR group and we suggest that sufficient lateral subtalar release can be obtained with a posteromedial incision.

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