Abstract:

This was a retrospective study analyzing surgical treatment of rigid, non-teratologic talipes equinovarus (club foot deformity) in Qatar in the ten year period from 1990 to 1999. Treatment started early (as soon as the patient was referred, usually during the first two – three weeks of delivery) with serial manipulation and adhesive strapping or plaster of paris casting. When clinically indicated, soft tissue release was performed.

One hundred and twenty one feet were operated upon in Hamad General Hospital during that period. (73 patients, 46 male, 27 female ). Postero-medial release was done in 73 feet; Achilles tendon lengthening in eight feet; posterior release in 32 feet. Most primary soft tissue procedures were performed between two and ten months of age. Primary bony procedures were done for eight feet with late presentation.

Posterior release alone resulted in a higher rate of secondary procedures (53%), whereas postero-medial release resulted in only 22%. Therefore we recommend postero-medial release whenever in doubt about the adequacy of posterior release.

Key words: Clubfoot, Posterior release, Postero-medial release.

Introduction:

The clubfoot (talipes equino varus) deformity has three basic components:

1) Forefoot adduction, 2) Hindfoot inversion, usually associated with supination (called varus) and 3) Hindfoot plantar flexion (called equinus)¹.

Clubfoot deformity is classified into 3 types¹:

I) The non-rigid type (positional) is flexible and can be treated successfully without surgery. It has a soft springy feel, a normal size foot and is easily corrected manually.

II) The rigid type has small feet, rigid due to atrophic muscles (bean shaped feet). Most of these patients require surgery.

III) The resistant rigid type of clubfoot is seen in association with arthrogryposis, myelomeningocele or other deformities (teratological club foot). Treatment is much more difficult and the deformity is more resistant to treatment.

Untreated, club foot deformity causes significant disfigurement and disability. The weight of the walking child is carried by the lateral side of the foot. Shoe fitting becomes a problem and secondary psycho-social complications are considerable. Subsequent changes in bones and other tissues make treatment more difficult and less rewarding.

Early treatment is important but the treatment is lengthy and demanding. Repeated manipulations and long periods of castings are required and surgical treatment is often needed. Repeat operations are frequently required²,³,⁴ and reports of satisfactory operative treatment vary widely in the literature⁵-⁹.

This study was concerned only with the management of patients with rigid, non-teratological clubfoot. (Type II of the deformity) and it reviews the results of operative management of Type II deformity at Hamad General Hospital, Qatar.

Patients and Methods:

In Qatar the deformity is recognized at the Women's Hospital by the obstetrician and pediatrician. The child is referred very early to the Orthopaedic Department for management. On receiving an infant with clubfoot in the Orthopaedic clinic a thorough physical examination is performed, looking for bilateral involvement and other possible associated anomalies. These patients have a higher prevalence of developmental dysplasia of the hip and ultrasound of the hips is often requested. Specific neurologic and other disorders, such as spina bifida and arthrogryposis, must be ruled out. Conservative treatment is started immediately with passive manipulation and adhesive
strapping or plaster of pariss casting, repeated every two weeks. Clubfeet not responding to conservative treatment (as shown by residual deformity) are booked for surgery.

In the period between 1990 and 1999, 73 patients with rigid non-teratological club foot deformity were admitted to Hamad General Hospital for operative correction. The clubfoot was bilateral in 55 patients (only 103 feet needed operative treatment, seven contralateral feet were treated conservatively). The deformity was unilateral in 18 patients. A total of 121 primary operations were performed for clubfoot deformity in this period. In eight feet, bony procedures were required for late presentation. Cuboid osteotomy was needed in two feet in children presented at more than three years of age and triple arthrodesis was performed in six feet in patients presented at more than 10 years of age. Soft tissue releases as primary procedures were performed in a total of 113 feet. Most primary soft tissue surgeries were performed between two and ten months of age.

Postero-medial release was done in a modified Turco technique (with an oblique transverse incision, the tendons of tibialis posterior, flexor digitorum longus, flexor hallucis longus and the Achilles tendon were lengthened). The average time for the procedure was 75 minutes. Postero-medial release was performed in 73 feet. Posterior soft tissue procedures were done for persistent and rigid equinus in 40 feet (percutaneous Achilles tendon lengthening in three feet, open Achilles tendon lengthening in five feet, posterior release in 32 feet). Posterior release included division of contracted posterior capsular structures with lengthening of the Achilles tendon. Average time for this procedure was 35 minutes.

Post-operatively a cast extending above the knee was applied and was changed frequently for three months after which orthopaedic shoes and night splints were prescribed. Patients were followed at six monthly intervals continuing until the end of the growth period.

In cases of recurrence, secondary operations were performed as indicated. Secondary soft tissue procedures were in the form of posterior release, postero-medial release or tibialis anterior split transfer. Thirty feet required secondary soft tissue procedures and some cases required secondary bony procedures in the form of cuboid wedge resection (in two feet) or dorsal tarsal osteotomy in one foot.

The results of the operative treatment were recalled from the inpatient and outpatient notes. The success of management was reflected by the overall clinical course.

Results:

Of the 73 feet who had postero-medial release, 16 secondary operations were required (posterior release in four feet, repeated postero-medial release in four feet, tibialis anterior tendon transfer in two feet, postero-medial release and tibialis anterior tendon transfer in three feet, tibialis anterior tendon transfer combined with cuboid wedge resection in two feet and dorsal tarsal osteotomy in one foot).

Of the 32 feet with posterior release, 13 secondary postero-medial releases were needed and four feet required tibialis anterior tendon transfer. A total of 17 secondary procedures were needed (53%) after posterior release. Eight feet treated either by percutaneous or open lengthening of the Achilles tendon required two secondary postero-medial releases (25%).

Patients with primary soft tissue release had an outpatient follow-up of up to nine years. No patient complained of pain in the feet or of a functional deficit and all patients walked with a normal plantigrade gait; no analgesics were prescribed at subsequent outpatient visits; school attendances were not affected and there appeared to be no restriction of school sporting activities.

Only one case of wound infection and subsequent osteomyelitis was described in a post-cuboid osteotomy. The infection was controlled by debridement and antibiotics. Slight residual adduction was described in the majority of patients with posterior procedures and in 18 patients (27%) with postero-medial release. No case of over correction of the deformity was described despite the early age of many of the patients at the time of operation (cf. Franke).

Discussion:

Clubfoot deformity is a challenging condition. Reports of satisfactory results of operative treatment vary (Main 74%(1), Turco 84%(2), McKay 70%(3), Franke 94%(4), Simons 72%(5)). The need for secondary operation also was reported variably in the literature; Raab 25%(6), Pecak reported secondary procedures to be needed in 31% after postero-medial release and in 37% after posterior release(7) and Pavlovic reported 41% secondary operations after postero-medial release and 68% after posterior release.

In Qatar, 73 patients (with 121 club feet) were admitted to Hamad General Hospital for operative treatment over a period of ten years. Postero-medial soft tissue release was performed on 73 feet of which 16 (22%) later required secondary procedures. Thirty two feet with complete posterior release later needed 17 (53%) secondary procedures. The ratio of the secondary operations per treated foot after posterior release and postero-medial release was 2:4:1. Main(5) reported a ratio of 1.6:1. Lengthening of the Achilles tendon in eight milder cases required two secondary operations (25%).

Most of the secondary procedures were soft tissue releases. Secondary bony procedures were needed in only three patients (cuboid osteotomy in two feet, dorsal tarsal osteotomy in one foot). These comprised only 2.6% of the feet treated primarily with soft tissue releases. Secondary bony procedures were needed in 53% in another study(8). No triple arthrodesis was described as a secondary procedure for patients operated upon in Qatar.
Table I: Primary procedures performed for clubfeet in Hamad General Hospital

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percutaneous lengthening of the Achilles tendon</td>
<td>3</td>
</tr>
<tr>
<td>Open lengthening of the Achilles tendon</td>
<td>5</td>
</tr>
<tr>
<td>Posterior release</td>
<td>32</td>
</tr>
<tr>
<td>Posteromedial release</td>
<td>73</td>
</tr>
<tr>
<td>Posteromedial release + cuboid osteotomy</td>
<td>2</td>
</tr>
<tr>
<td>Triple fusion</td>
<td>6</td>
</tr>
</tbody>
</table>

The clinical results in the study group were satisfactory as shown by the good functional status of the patients, plantigrade feet and a satisfactory shoe fitting, no complaints in daily activities and satisfactory participation in school sports activities. The need for secondary operations could be reduced by more adequate surgery addressing all aspects of the deformity at the primary intervention.

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Table II: Secondary procedures after primary soft tissue operations performed in Hamad General Hospital:

<table>
<thead>
<tr>
<th>Primary Procedure</th>
<th>No. of Cases</th>
<th>No. of Secondary Procedure Needed</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lengthening of the Achilles tendon</td>
<td>8</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>Posterior release</td>
<td>32</td>
<td>17</td>
<td>53%</td>
</tr>
<tr>
<td>Posteromedial release</td>
<td>73</td>
<td>16</td>
<td>22%</td>
</tr>
</tbody>
</table>

Conclusion:
Addressing all aspects of clubfoot deformity by posteromedial release resulted in less need for secondary procedures compared with the simpler posterior release.

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References: