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Original Research Paper

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MANAGEMENT OF ATYPICAL IDIOPATHIC CLUB FOOT WITH MODIFIED PONSETI METHOD.

Dr. Vidya Bhushan Singh Associate Professor, Department of Orthopaedics, Shyam Shah Medical College, Rewa, M.P., India

Dr. P. K. Lakhtakia* Professor, Department of Orthopaedics, Shyam Shah Medical College, Rewa, M.P., India *Corresponding Author

ABSTRACT Atypical idiopathic clubfeet are clinically distinguished by significant shortening, rigid equinus with a deep crease above the heel, severe plantar flexion of all metatarsals, a deep plantar crease across the sole of the foot, high cavus with a short and hyperextended great toe and the feet are resistant to treatment. Ponseti has described a modified technique for treating such rigid clubfeet.

KEYWORDS : Atypical Club Foot, Modified Ponseti Method, Achilles Tenotomy

Introduction:

Club foot is a most common congenital musculoskeletal deformity affecting approximately 1-2 per 1000 live births. Today, Ponseti method has become the gold standard for the initial treatment of clubfoot. Its safety and efficacy has been demonstrated extensively in the literature [1-9]. Most clubfeet correct with four to six manipulations followed by plaster cast applications by skillful orthopaedists. However, a small percentage of clubfeet called atypical are very severe and difficult to treat. Such club feet are refractory to the usual corrective manipulation and casting. Some of these feet may appear typical when the infant is born, with the sole of forefoot facing to the other foot. Others are in very severe supination with the forefoot and toes pointing to the thigh of the same leg. The calf muscles are small and the tendo Achillis is very tight, pulling the calcaneus into severe equinus causing a deep crease above the heel. The forefoot is in adduction and all the metatarsals are in plantar flexion, causing a severe cavus and a deep crease across the sole of the foot. Although the forefoot adduction can be corrected easily with one or two plaster casts, the metatarsals remain in severe plantar flexion. Additional attempts to correct the hindfoot varus by abducting the foot deformity push the metatarsals and toes into additional flexion and abduction resulting in a grotesque deformity [10]. Ponseti et al.(2006)advised about change in his standard treatment in these feet [11]. We performed these modifications in the standard Ponseti technique of manupulations and casting and retrospectively analysed the short term results.

Materials and methods

We retrospectively reviewed 211 patients with congenital idiopathic clubfoot treated at our institutions from January 2015 to January 2019. Of these 211 patients, 9 (12 clubfeet) were recognised as atypical. Of these, 6 were male and 3 were female. The average age of the patients at presentation to our clinics was 2.5 months (range, 2 week–5 months). The most common complaint for which the patients were brought to our clinic was resistance of club feet to traditional Ponsti`s method of treatment. The all patient had been treated somewhere else and when seemed non-responding with plaster cast treatment then they were sent to our clinic. We did not know the actual technique of plaster cast application which was used by the referring orthopaedic surgeon but there treatment record showed that average 14 casts (11- 17) were tried before patient were referred to us. On history taking 5 out of 9 parents said that the feet were not being corrected rather repeatedly being slipped out of the casts after showing some initial response to the treatment. The feet could be easily abducted at mid foot level but the equines deformity and problem of frequent slippage of cast could not be solved by referring surgeon. On examination the babies were found to be chubby and their feet were oedematous, short and stubby, with deep creases across the sole of the foot and above the heel [Fig-a]. The ankle and foot was in severe planter flexion and making the foot look short and arched downward. The oedema wrinkles, and sores were present on the dorsal skin of the feet as a result of frequent slippage of casts. The big toes were in hammertoe position and the whole foot was grotesquely stunted. Four of these patients had a percutaneous tendo Achillis tenotomy. The average Pirani severity score was 5.5 (ranged 5- 6). We decided to treat these children using modified Ponseti technique of manipulation and corrective cast application. Before starting the treatment, the feet were left cast free to resolve the oedema and improve the soft tissue condition for around 2 weeks. Correction started with precise identification of the talar head. The forefoot was grasped with one hand while feeling the malleoli from the front with the thumb and index finger of the other hand. The thumb and index finger then were moved forward to clasp the head of the talus and feel the navicular on one side. The foot was slowly abducted, and the anterior tuberosity of the calcaneus moved laterally under the head of the talus. While manipulating the foot we felt forefoot adduction got easily corrected with 1 to 2 weekly casts and medial structures of the feet showed less resistance to stretching. However, the metatarsals remained in severe plantar flexion and the hindfoot in severe equinus. Care was taken not to hyperabduct the metatarsals and hindfoot. After obtaining 20-30 degrees of abduction hyperflexion of the metatarsals and rigid equinus were corrected simultaneously by grasping the foot by the ankle with both hands while the thumbs under the metatarsals pushed the foot into dorsiflexion as an assistant stabilized the knee in flexion. The foot was then first immobilised in a below knee plaster cast with a reinforcing plaster slab behind the ankle and foot. After that cast was extended upto the upper third thigh with the knee in at least 110° flexion by applying a plaster splint in front of the knee, reinforced by a plaster bandage around the thigh, avoiding excessive plaster behind the knee. The final cast was applied after percutaneous Achilles tenotomy under local anaesthesia to correct equines in all cases [Fig-b]. The tenotomy always was performed 1.5 cm above the posterior skin crease of the heel, avoiding damage to the calcaneus tuberosity which is usually very high given the severe equinus. In most cases (8 out of 12 feet) dorsiflexion could be achieved at least up to 5` immediately after tenotomy and an above knee cast was applied for 3 weeks. In rest 4 cases where dorsiflexion could not be achieved, the cast was removed after one week, stretching the posterior capsule was done and the cast reapplied till the desired dorsiflexion greater than 5` was achieved. The final cast was removed after 3 weeks and after that an abduction splint was given with the abduction not beyond 40°. Final mean ankle dorsiflexion at the end of the correction was 10° (range, 5°–20°). After the removal of the final cast the feet were kept in an abduction splint with well-molded shoes attached in 40° outer rotation to a foot abduction bar to prevent relapse of deformity.

Result:

At the last follow-up of average 6.5 months (ranged 4 to 8 months),

all feet were corrected with mean ankle dorsiflexion of 14° (range, 10°–20°) [Fig-c]. One patient developed a relapse after initial successful treatment 7 months later, probably due to inadequate brace wearing which was treated with repeat modified Ponseti manipulation and casting. Brace noncompliance was said to be related to problems with shoe fit with subsequent slippage of the foot and development of skin lesions. Two patients had some skin related complications including erythema, slight swelling and mild deformity such as midfoot hyperabduction. No infections or profuse bleeding were observed after the tenotomy.

Fig- a b c

Discussion:

Ponseti method of club foot management has shown excellent results worldwide. However, a small percentage of club feet are stiff and resistant to manipulation especially against cavus and equines deformity [12-15]. These feet are short and stubby and the hindfoot is in severe equinus and varus. The calf muscles are small and the tendoAchillis is long, wide, and tight. The forefoot is adducted and all metatarsals are in severe plantar flexion. There is a deep crease across the sole of the foot and another above the heel. The great toe is short and in dorsiflexion. Treatment of such cases with standard Ponseti method fails to correct severe cavus and equines deformity rather it exaggerate the abduction of forefoor at tarsometatasal joint. It causes recurrent slippage of plaster cast and the deformity gets further exaggerated and foot becomes swollen. This type of clubfoot is difficult to treat and requires modification of standard Ponseti technique. Adduction of forefeet should not be corrected beyond 40` to prevent hyperabduction at tarso-metatarsal joint. Adduction should be corrected by keeping thumb on lateral aspect of talar head and index finger of same hand behind lateral malleolus. This also corrects heel varus. Once the heel varus is corrected, the planter-flexed forefoot and the equinus are corrected simultaneously by forcefully dorsiflexing the metatarsals with both thumbs while keeping index fingers of both hands on dorsal aspect of talar head. The cast is re-enforced by applying a posterior slab behind the ankle. To prevent the cast from slipping , knee is immobilized at 110` of flexion and it is re-enforced with a slab applied anteriorly over the knee. A tenotomy is performed before applying the last plaster cast to facilitate correction of severe equinus. In our experience after treatment of atypical club using modified Ponseti method results in excellent correction of deformity as well as swelling and creases disappear and the foot develops normally.

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