



ACHILLES TENOTOMY PERFORMED PERCUTANEOUSLY UNDER LOCAL ANESTHESIA IN OPERATION THEATER ROOM IN CLUBFOOT.

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ABSTRACT... Objectives: Achilles tenotomy is required in 80 % of cases after the Ponseti method in clubfoot. There are many complications reported if it is performed percutaneously under local anesthesia in the clinic. Complications are bleeding from either posterior tibial artery or peroneal artery and sometimes from small saphenous vein. Nerve injuries like tibial nerve and sural nerve are also documented. Incomplete Achilles tenotomy is another complication responsible for recurrence of deformity and redo tenotomy. On the other hand, mini-open Achilles tenotomies performed under general anesthesia in Operation Theater have no such complications as mentioned above. The rationale of this present study is to document the safety and any complications when Achilles tenotomy is performed percutaneously under local anesthesia instead of mini-open technique under general anesthesia in the operation theater room. **Study Design:** Retrospective review study. **Setting:** Pediatric Orthopedic Department of the Children Hospital and the Institute of Child Health, Lahore. **Period:** 2014 to 2018. **Material and Methods:** In infants with congenital talipes equinovarus who underwent percutaneous Achilles tenotomy in operation theater room under local anesthesia. **Results:** Fifty patients with seventy five feet included in this retrospective study who underwent Achilles tenotomy percutaneously under local anesthesia in operation theater room. Before starting Ponseti casts, average Pirani score was 5.6. Before Achilles tenotomy, the average number of casts applied was 4.9. 11.9 weeks was the average age at the time of Achilles tenotomy. No vascular, neural and tendon related complications occurred in any infants and they discharged from hospital on same day. **Conclusions:** Achilles tenotomy performed percutaneously under local anesthesia in the operation theater room is more safe and comfortable for both family and pediatric orthopedic surgeon in clubfoot. No vascular, neural and tendon related complications occurred. Operation theater environment and local anesthesia are very beneficial for eliminating any chance of vascular, neural and tendon related complications.

Key words: Achilles Tenotomy, Clubfoot, Percutaneous.

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INTRODUCTION

The Ponseti method is a universally accepted, keenly learned and mostly adopted method for the treatment of idiopathic clubfoot. Dr. Ignacio pioneered this method in 1940. In this method, clubfoot is corrected by serial specific manipulations and then application of long-leg, well-molded plaster casts on the weekly basis to correct midfoot cavus, forefoot adduction, and subtalar varus components of the deformity.¹ Finally, Achilles tenotomy is performed for equinus deformity correction in approximately 80% cases.² This method is beneficial for infants because of cartilaginous nature of their bony

structures, and their ligaments, tendons, muscles and joint capsules well respond to stretching and plaster casts.³

Achilles tenotomy is performed percutaneously under local anesthesia in surgeon office. Botulinum toxin injection into the calf muscles⁴, percutaneous needle sectioning of Achilles tendon⁵ and a mini-open technique for Achilles tenotomy⁶ are different modifications in this usual procedure. Similarly it can be performed in operation theater or in outpatient clinic under general anesthesia⁷, under propofol sedation⁸ or under topical anesthesia.

When Tendoachilles tenotomy is performed percutaneously in the clinic, many complications are reported like bleeding from either posterior tibial artery or peroneal artery and sometimes from small saphenous vein.⁹ Nerve injuries like tibial nerve and sural nerve are also documented.¹⁰ Incomplete release of Tendoachilles is another complication responsible for recurrence of deformity.¹¹

The rationale of this present study is to document the safety and any complications when Tendoachilles tenotomy is performed percutaneously under local anesthesia in the operation theater room instead of mini-open technique under general anesthesia.

MATERIALS AND METHODS

This was a retrospective study performed from 2014 to 2018 in Pediatric Orthopedic Department of the Children Hospital and the Institute of Child Health, Lahore. Total fifty children with seventy five feet were included in this study. Our inclusion criteria was only idiopathic clubfoot not taking any treatment. All children with syndromic clubfoot, one foot having clubfoot while other foot has any other anomaly and children already taking treatment from somewhere else were excluded from the study. All children underwent standard Ponseti technique casts in our Ponseti clinic before Achilles tenotomy. When all other deformities except equinus were corrected, the children underwent percutaneous Achilles tenotomy under local anesthesia in operation theater room. Following data of each patient was recorded: gender, age at start of treatment, Pirani score at start of treatment, age at tenotomy, unilateral or bilateral foot involvement, number of casts required before tenotomy, vascular or nerve injury and need for redo tenotomy.

The procedure was performed in a dedicated room in operation theater. All tenotomies were done by senior author himself with a resident doctor along with one male paramedical staff and one nurse. Resident doctor, male paramedical staff and nurse were deputed only in this room for this specific procedure. Before doing percutaneous Achilles tenotomy it was assessed by senior

author that all other deformities were corrected and children only required equinus correction. After proper sterilization and draping Achilles tendon was palpated by maximally dorsiflexing the foot. Only 0.5 ml local anesthetic injection was given so that Achilles tendon remained palpable for proper and complete sectioning. After one minute of injection, again Achilles tendon was palpated and when sure it was sanctioned 1cm above the insertion of Achilles tendon. Tenotomy was confirmed by increase in dorsiflexion upto 15 degree above neutral. Tenotomy site was compressed by gauze pieces for one minute. The final cast was applied by maximally dorsiflexing the foot along with full abduction for three weeks.

Any complication immediate or late were documented. After three weeks, cast was removed and foot assessed for correction. Now patient order to wear foot abduction brace and called every month for follow-up.

RESULTS

Fifty patients with seventy five feet involved in this study underwent Achilles tenotomy percutaneously in operation theater room. Twenty five children had bilateral, fifteen had right-sided and ten had left-sided tenotomy. Before starting Ponseti casts, average Pirani score was 5.6. Before Achilles tenotomy, the average number of casts applied was 4.9. 11.9 weeks was the average age at the time of Achilles tenotomy.

No complaint given by parents regarding plaster problems or pain or loss of sleep or excessive crying.

No complications regarding bleeding from posterior tibial artery or peroneal artery or small saphenous vein occurred. No tibial or sural nerve injury was documented. No child needed redo tenotomy.

All tenotomies wound healed after removal of cast. After cast removal, dorsiflexion was as maximum as before cast application and without any discomfort or pain.

Two children developed minor problems which

dealt immediately and properly. One child came with wetting of cast accidentally by falling in basket containing water. Cast immediately changed after thorough care of tenotomy wound. Another child came with removal of cast after two weeks. On further inquiry, parents told that cast was required only for two weeks according to their understanding. This child again applied cast for one week more to complete three weeks which is needed for complete healing of Tendoachilles tendon.

Another child developed a major problem after one year of follow-up and that was dynamic supination during walking. He was again manipulated and applied cast but finally needed tibialis anterior tendon transfer.

DISCUSSION

The idiopathic clubfoot is now treated by Ponseti method all over the world. Treatment should be started as early as possible. In the Ponseti technique, serial manipulation of foot is done at one week interval and this specific position of foot is then maintained by well-moulded long leg cast.¹ First cavus is corrected, then adduction and varus are corrected and finally equinus is corrected. All deformities are corrected by manipulation and casting except equinus which is corrected by Achilles tenotomy and casting.² Another difference is that all plasters are changed at weekly interval except last one which is changed after three weeks for complete healing of Tendoachilles tendon. After this correction phase, maintenance phase is stated by wearing foot abduction brace 23 hours a day for three months and then during night and laps time upto four years.

Achilles tenotomy is usually performed percutaneously under local anesthesia in surgeon office. Now there are many modifications to this usual procedure regarding place of procedure, type of anesthesia and procedure technique. Each modification has advantages and disadvantages. Botulinum toxin injection into the calf muscles⁴, percutaneous needle sectioning of Achilles tendon⁵ and a mini-open technique for Achilles tenotomy⁶ are modifications in procedure technique. Similarly it can be performed in

operation theater and in outpatient department. This is modification in procedure place. Last modification is type of anesthesia which include general anesthesia⁷, propofol sedation⁸ and topical anesthesia.

Achilles tenotomy by mini-open technique reduces the chances of incomplete tenotomy and neurovascular injury by direct visualization of structures in the operating room but cost of operation theater and complications of general anesthesia are risk factors.¹²

Percutaneous Achilles tenotomy with a wide gauge needle under local anesthesia has less chances of complications as compared to a surgical blade, less invasive, more safe, simple and effective as compared to other methods of tenotomy.¹³

Percutaneous Achilles tenotomy performed under local anesthesia in the office is easy, simple, low cost but many complications reported in literature. These complications are bleeding from either posterior tibial artery or peroneal artery and sometimes from small saphenous vein⁹, nerve injuries like tibial nerve and sural nerve¹⁰ and incomplete release of Tendoachilles.¹¹

Robert Jay in his study showed that Botulinum A toxin is not helpful in decreasing correction time for casting and eliminating need for percutaneous Achilles tenotomy.⁴

In this study we performed Achilles tenotomy both percutaneously and under local anesthesia but in operation theater. The only difference is place of procedure. This is the first study done in this regard and has many advantages. Good procedure control by surgeon, more safety, better handling of complications, more chances of training of residents and availability of anesthetists are some of these advantages.

Percutaneous Achilles tenotomy performed in the office or outdoor clinic has many complications but we have no complication in our study. Cost is also comparable with office or clinic procedure because we only use operation theater not

general anesthesia or sedation. In one way our study is similar in reducing complications while on the other way is superior in cost and safety issues to mini-open technique of Achilles tenotomy performed in operation theater under general anesthesia.

This technique is more useful and acceptable because we are doing tenotomy without general anesthesia in operation theater. There are always risks for infants in general anesthesia. DiMaggio et al. in their study showed that children have behavioral and developmental disorders with early exposure to anesthesia.¹⁴

CONCLUSION

Achilles tenotomy performed percutaneously and under local anesthesia in the operation theater is more safe and effective than another method of Achilles tenotomy. There are no complications because of operation theater environment. Cost and time consumption is similar to office or clinic procedure. Hence, this technique can be adopted in place of mini-open technique of Achilles tenotomy performed under general anesthesia.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Abdul Latif Shahid	Pricipal author, Proposal topic, Basic study design, data collection.	
2	Abdul Latif Sami	Co-author, methodology, literature review.	
3	Farhad Alam	Co-author, statistical analysis and interperetation of resutls, Proof reading + references.	