Minimally Invasive Juxtamalleolar Aspiration Lipectomy, An Aesthetic Procedure

Authors:
***Robert G. Parker, DPM, FACFAS, FAENS, FASPS**
#Mark D. Schuenke, PhD
+Peter Pham, DPM, AACFAS

Abstract: Lipomas are slow growing benign soft tissue tumors. The purpose of this paper is to present a procedure, perhaps new to publication but one that is almost two decades old to one of the authors (RGP), of a minimally invasive technique for the treatment of symptomatic juxtamalleolar lipoma utilizing assisted aspiration and suction. A step-by-step technique guide for lipoma removal/aspiration is described. Compared to traditional open technique, the author presents a minimal invasive technique for treatment of juxtamalleolar lipoma with improved patient outcomes and satisfaction with no recurrences.

Level of Evidence: V

The authors report no conflict of interest.

Keywords: Juxtamalleolar Lipoma, Minimally Invasive Lipectomy

A juxtamalleolar lipoma is a semi-fluctuant, irregular lobulated fatty mass anteroinferior to the lateral malleolus, commonly occurring bilaterally[1]. While the literature suggests lipomas of the feet are common, the juxtamalleolar lipomas are commonly overlooked and under-diagnosed[2]. The etiology of these lipomas is unknown and may have a relatively sudden onset or may gradually appear over a years. They tend to occur in middle age or post menopausal, overweight females over the inferior anterolateral malleoli. Differential diagnosis of lipomas around the malleoli are ganglion cyst, rheumatoid nodules, epidermal inclusion cyst, gouty tophus, edema from congestive heart disease, ankle synovitis, and sinus tarsi syndrome.

The foot and ankle podiatric physician has seen this condition too frequently, yet there has been little written about the frequency or treatment of the antero-submalleolar mass.

They may be painful due to compression of the communicating branch from the sural nerve that normally transverses inferior to the lateral malleolus and in the direct area of ~~to~~ this fatty mass. This nerve, present 33% of the time, is anastomosing with the intermediate dorsal cutaneous nerve (Fig 1). This may be the "embedded sensory nerve" described in Lemont's report[3]. A positive Tinel's sign may be present at this spot, if compression is present. It should be noted that traditional procedures may inadvertently excise this nerve which may generate a stump or true neuroma, a condition much worse than the lipomatous mass. The confirmed "embedded" sensory nerve found in Dr. Lemont's report may very well be indicative of excision of this very nerve. The minimally invasive procedure, described here, may also have the complication of nerve irritation, resulting in short-term paresthesias, which have ultimately resolved (RGP, unpublished observations).

Fig. 1: Shown here the communicating branch between the sural nerve and the lateral most branch of the Intermediate Dorsal Cutaneous Nerve (branch of the superficial fibular nerve) traversing the area of where lipoma normally presents.

Patients with juxtamalleolar lipomas are often repulsed by the unsightly appearance of the bulges in their outer ankles. Patients have described them as "cankles". Standard procedure for removal is open excision, often resulting in an unsightly scar. Here, the authors offer an aspiration procedure for treating juxtamalleolar lipomas. Though this procedure is not commonly used by foot and ankle surgeons, the one author (RGP) has employed the technique with great success for nearly two decades.

Typically patients present with only one mass. However, patients may present with multiple masses (Fig. 2), an antero-lateral juxtamalleolar mass as well as a mass along the dorso-lateral aspect of the midfoot overlying the metatarso-cuboid area. These masses may also be found posterior to the malleolus simultaneously. Obviously while performing aspiration lipectomy around the anterior, inferior, and posterior aspects of the lateral malleolus, the surgeon must be cautious of the multiple nerves that can be damaged.

Relevant Nerve Anatomy:

Proximal to the popliteal fossa, the sciatic nerve defasciculates into two terminal branches: (1) common fibular nerve (CFN) and the tibial nerve. It should be noted that many readers refer to the CFN as the common peroneal nerve; however, the XI Federative International Congress of Anatomy (Mexico City 1980) voted to officially change the preferred nomenclature of the nerves from peroneal to fibular. In 1998, *Terminologia Anatomica,* the international standard on anatomical terminology, officially changed the preferred nomenclature of the muscles to match that of the nerves[4].

The CFN arises from the ventral primary rami of spinal nerves L4-S2 and travels in a common epineurium with the tibial nerve, collectively termed the sciatic nerve. The CFN typically follows the course of the posteromedial border of the short head of the biceps femoris muscle. As the CFN passes posterior to the fibular head, it enters the fibular tunnel (between the fibular head and fibularis longus muscle). Emerging from the tunnel, it wraps around the lateral surface of the fibular neck and defasciculates into superficial and deep fibular nerves (SFN and DFN, respectively), as well as a recurrent articular branch.

The SFN then enters the lateral leg compartment, proving motor innervation to the fibularis longus and brevis muscles and cutaneous innervation to the anteroinferior portion of the leg. In approximately one quarter of the population, the SFN is located in the anterior compartment of the leg and may provide motor branches to the extensor hallucis longus muscle [5]. After passing between the fibularis longus and extensor digitorum longus muscles, approximately 7.7 cm proximal to the intermalleolar line, the SFN pierces the crural fascia [6]. The SFN then defasciculates into a medial and intermediate dorsal cutaneous nerves (MDCN and IDCN, respectively) [7,8]. The MDCN crosses anterior to the talocrural joint, equidistant from the medial and lateral malleoli, and bifurcates into dorsal digital nerves, supplying parts of the first three digits [9]. The IDCN also crosses the anterior surface of the talocrural joint at approximately one-third the distance from the lateral malleolus to the medial malleolus and branches to provide dorsal branches to third through fifth digits, as well as a cutaneous branch to the lateral malleolus [9,10].

The lateral dorsal cutaneous nerve (LDCN) is a branch from the sural nerve. The sural nerve is often described as being formed by medial and lateral sural cutaneous nerves, branches of the tibial and common fibular nerves, respectively [11,12]. In some cases, the sural nerve may instead be formed by the medial sural cutaneous branch and a communicating branch of the CFN or SFN [13,14,15]. The sural nerve passes distally the groove created by the convergence of the medial and lateral gastrocnemius heads. Initially, the sural nerve is deep to the investing fascia of the gastrocnemius muscle, but it becomes superficial at approximately 2/3s the length of the distal limb. Once in the superficial fascia, it travels with the short (small) saphenous vein. As the sural nerve descends, it courses laterally, passing posterior to the lateral malleolus and then providing

cutaneous innervation along the lateral foot. In up to 33% of the population, the sural nerve may communicate with the IDCN [16,17].

"Step-by-Step" Guide to the Surgical Technique:

1. The patient is placed in a supine position. This procedure is easily performed under local anesthetic with no tourniquet. Indeed, the established "tumescent technique" developed by Jeffrey Klein, MD , eliminates general anesthesia and constricts capillaries preventing surgical blood loss [18]. Because this technique allows procedures to be performed in the clinic without a tourniquet, it allows for aspiration totally under local anesthesia (if preferred) and allows for slower absorption process of fluids spread over 24 to 35 hours of time. This reduces the chance of rapid heartbeat which may be experienced with the standard undiluted lidocaine with epinephrine which can be absorbed more rapidly into the bloodstream. When larger amounts of tumescent fluid are used in other parts of the anatomy it is of major concern that these fluids may be absorbed into the bloodstream. However, in the ankle areas of the lower extremity, we are far less likely to have this experience. (Note: The procedure may be performed outpatient with general anesthesia. It is more desirable to have a thigh tourniquet, which provides greater visibility and accessibility without the ankle tourniquet obstructing the procedure).

2. Identify and mark the outer margins of the lipoma to easily define the area in which you will be working prior to utilizing the tumescent fluid about the anterior sinus tarsi area, as the volume of local can distort the margins and appearance of the lesion. Carefully identify and mark the intermediate dorsal cutaneous nerve (almost always visible), sural nerve and imagine where the communicating branch from the sural nerve might traverse inferior to the lateral malleolus to avoid damaging these nerves. (Fig 2).

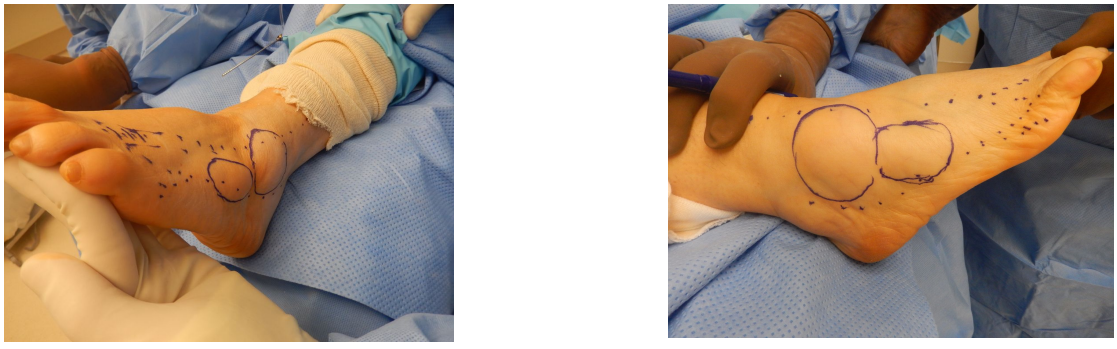

Fig. 2: Skin markings around the juxtamalleolar lipomata. The intermediate dorsal cutaneous nerve, sural cutaneous nerve are marked out.

2. Instruments are the Short Garden Spray Infiltration Cannula, One Hole Aspiration Flat Tip Spatula Cannula, and a Three Hole Blunt Tip Micro Cannula, Luer Lock Cannula

Handle (Fig 3) from Medco Houston and the Suction apparatus, Medco IV aspirator unit (Fig 4) found at most outpatient facilities and hospitals.

Fig. 3: From left to right: Short Garden Spray Needle, One Hole Aspiration Flat Tip Spatula, and a Three Hole Blunt Tip Micro Cannula and Standard Luer Lock 6 1/2" Cannula Handle

Fig. 4: Medco IV aspirator unit found at most outpatient facilities and hospitals

3. Prepare tumescent fluid with local anesthesia with a 20 fold mixture of anesthetic Lidocaine 1%, with 1:200,000 Epinephrine 15ml and Kenalog 1 ml. to total in 300 ml of Lactated Ringers Solution. Infiltrate the mass with tumescent fluid (Fig 5) with needle and syringe. Then infiltrate instilled throughout the mass with a Short Garden Spray needle, approximately 15-20 ml of fluid is normally instilled, depending on the size of the mass.

Fig 5: Infiltrate area with tumescent fluid formulated with 1% lidocaine with epinephrine 1:200,000 approximately 7.5ml, Kenalog 1 ml. in 300 cc of Lactated Ringers solution

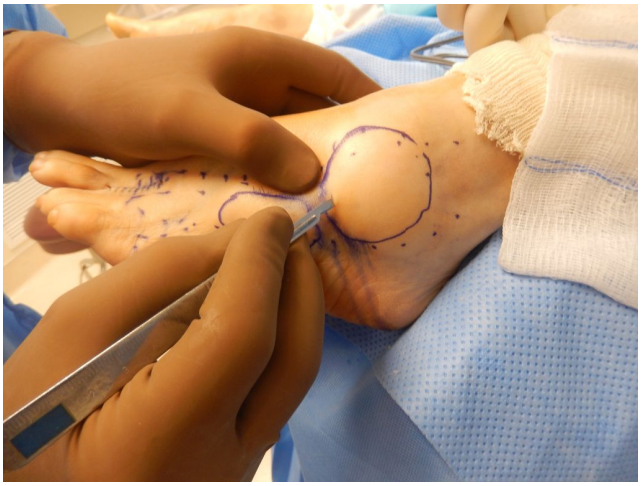

Fig 6: Minimally Invasive puncture is utilized, plastic surgeons may use a 2mm punch, for Introduction of Short Garden Spray Tip and Suction Tip Portal of Entry (notice increased "firm and swollen" volume from tumescent)

The technique is one of a "fanning" action through a small stab incision or 1-2 mm punch hole (Fig 6) just inferior to the lesion until the fluid has permeated the entire mass. Wait a couple of minutes.

Fig. 7: Short Garden Spray Needle.

4. After allowing a couple of minutes for the tumescent fluid action to occur, a Three Hole Blunt Tip Micro Cannula Tip Spatula is connected to the handle and aspirator tubing and a Medco aspirator (Fig 7). The handle is held as though grasping a screwdriver (Fig 8). Suction/aspiration assisted lipectomy of the anterolateral malleolar area just over the sinus tarsi is now accomplished.

Fig. 8:Three Hole Blunt Tip Micro Cannula on Handle and connected to aspirator tubing preparing to perform suction assisted lipectomy.

5. The aspiration technique is one of placing your index finger and thumb of what is called your “smart hand” as it can feel the fat reducing and help to “herd” the cells together in a "pinching" fashion to contain the adipose tissue as the cannula is “worked” in an “in and out sweeping fashion” aspirating the subcutaneous adipose tissue via the inferior stab incision. As you feel the mass disappearing, you will notice the adipose tissue gathering in the transparent suction tubing (Fig 9). You will then notice the normal anatomical shape and contour of the ankle area begin to return.

Fig. 9: index finger and thumb of your “smart hand” in a "pinching" fashion to contain the adipose tissue as the cannula is “worked in and out in a sweeping fashion” and feeling the normal contours as they return.

6. Care must be taken to palpate any remaining adipose tissue in the periphery of the mass. This is removed with the smaller One Hole Aspiration Flat Tip Spatula (Fig 10). The incision is left open without sutures to allow for escape of any excess blood or fluids.

Fig. 10: Remaining adipose tissue in the periphery is removed with smaller One Hole Aspiration Flat Tip Spatula.

7. Intra-operative dressings include gauze folded the approximate size of the mass to provide a firm sterile compression directly in the areas where the mass was to avoid hematoma and maintain the skin in close apposition to the underlying deep fascia. Sterile Coban wrap is perfect for this bandage (Fig 11). This type of compression bandage must be maintained postoperatively for 4 weeks. Release pneumatic tourniquet (if applicable). Patient remains weight-bearing as tolerated with a surgical shoe.

Fig. 11: Compressive dressing post operatively to help prevent edema, seroma, and hematoma.

Postoperatively, within 2-5 days, the dressings are removed and the "void" areas are maintained by adding 1/4 inch felt padding overlying the areas to keep the subdermal soft tissue from allowing edema, hematoma, or seroma from forming (Fig. 12 & 13). Again, Coban compression wrap is perfect for this bandage. Sutures are removed within 2-weeks but this compression bandage must be maintained for 4 weeks.

Fig. 12 & 13: This is the patient 10 days postoperatively showing the proper 1/4 inch felt padding replacing the guaze overlying the areas to keep the subdermal soft tissue from allowing the edema, hematoma, seroma from forming.

Discussion

There is a paucity of literature on juxtamalleolar lipomas likely because it is often considered insignificant, is not addressed with the patient, and therefore remains

undiagnosed. The authors feel that especially the female patient with these unsightly masses, are embarrassed by them and will simply not address them unless the topic is brought up by the foot and ankle surgeon. Although lipomas are frequent elsewhere in the body, they only account for 2% of soft tissue lesions in the foot [19]. To our knowledge, this technique has not been described in the literature before. The authors present this less invasive method due to the patient occasionally complaining of pain and perhaps difficulty with ambulation, but by in large it is of a cosmetic concern that motivates our patients to have these addressed. Rather than using the traditional and more invasive technique, the advantages of this minimally invasive procedure include a minimal scar, shorter recovery, minimal soft tissue dissection and greater patient satisfaction. One author (RGP) has been using this technique for almost 20 years now with no reported complications or recurrences (Note: as with any surgical procedure, there is a learning curve). The authors suggest this procedure is best performed by a surgeon who is familiar with minimally invasive surgical techniques.

*Robert G. Parker, DPM, FACFAS, FAENS, FASPS
2013 President, CoFounder, Fellow, Association of Extremity Nerve Surgeons
Past Examiner, Diplomate, American Board of Foot and Ankle Surgery.
Fellow, Past President SW Division, American College of Foot and Ankle Surgeons
Co- Founder Past Director of the Harris County Podiatric Residency Program,
Houston, Texas

Mark D Schuenke, PhD Associate Professor of Anatomy, University of New England College of Osteopathic Medicine, Biddeford, ME

+Peter Pham, DPM, AACFAS, Third Year Resident, Harris County Surgical Residents, Houston, Texas

Equipment and instruments, Short Garden Spray Needle, One Hole Aspiration Flat Tip Spatula, and a Three Hole Blunt Tip Micro Cannula, Luer Lock Standard Hand Piece, and Medco IV aspirator unit found at most outpatient facilities and hospitals can be purchased from medcomanufactoring.com or sales@medcomanufactoring.com

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