HealthNews DIGEST

JUNE 2024

Aster HOSPITALS & CLINICS

We'll Treat You Well

Dr. Sherbaz Bichu

CEO & Specialist Anaesthetist
Aster Hospitals & Clinics, UAE

On behalf of Aster's leadership, I am thrilled to extend my warmest congratulations to all of you on the 22nd edition of HealthNews, our prestigious newsletter that never stops giving us informative case studies and articles on uncommon and complicated medical conditions.

Additionally, I want to acknowledge the importance of some of the significant medical days of the month. June is recognized as Men's Health Month, Alzheimer's and Brain Awareness Month, and National Safety Month. These important observances allow us to raise awareness about crucial health issues and encourage individuals to take proactive steps towards better health and wellbeing.

It is essential that we stay vigilant and work together to advance medical knowledge and research. I look forward to your continued collaboration in advancing medical knowledge and providing exceptional care to our patients.

Dr. Ramanathan V

Medical Director
Aster Hospitals & Clinics, UAE

As the Medical Director for Aster Hospitals and Clinics, I would like to extend my heartfelt congratulations on the 22nd edition of HealthNews. Your passion, expertise, and dedication to these editions are commendable.

What matters more is your steadfast dedication to expanding medical knowledge and giving our patients the best treatment possible. I want to commend our medical staff for their outstanding work in managing critical cases. HealthNews plays a vital role in keeping us informed and up-to-date with the latest medical developments, and I am confident that it will continue to be a valuable resource for us all.

Please continue sharing your knowledge and expertise to help improve the quality of care we provide, stay up to date with the most recent developments in our fields, and enhance the quality of service we offer.

Successful Management of an Incidental Finding of Cor Triatriatum Sinister (Heart with Three Atria) in a patient presented with Chest Pain at Aster Hospital, Mankhool

Dr. Sachin Upadhyaya
Cardiology (Specialist)

PRESENTATION

- 51 year old male
- Presented to the outpatient department with complaints of chest pain for 2 weeks
- Pain was retrosternal with no specific aggravation or relieving factors
- History of occasional episodes of chest heaviness that increased on exertion, but these were atypical symptoms
- History of hypertension, on medication

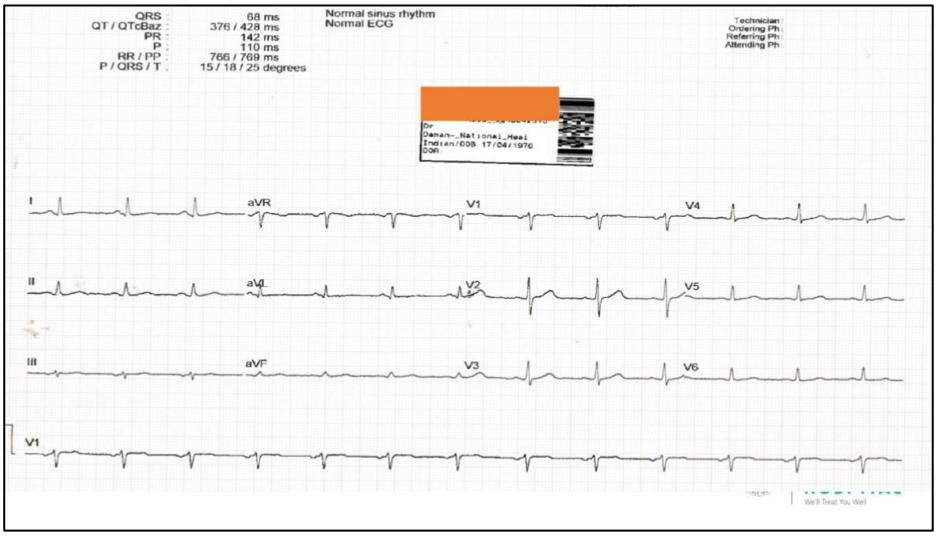
FINDINGS

During Examination:

- Conscious and oriented
- Afebrile
- PR: 86 bpm
- BP: 119/79 mmHg
- SpO2: 98% on room air
- CVS: S1, S2+, no murmurs heard
- RS: Normal
- Normal Troponin T

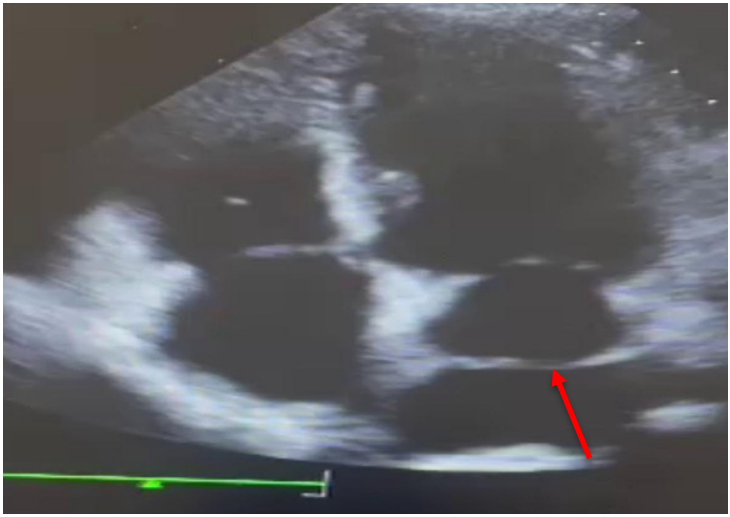
ECG showed:

- Normal sinus rhythm with no ST-T changes



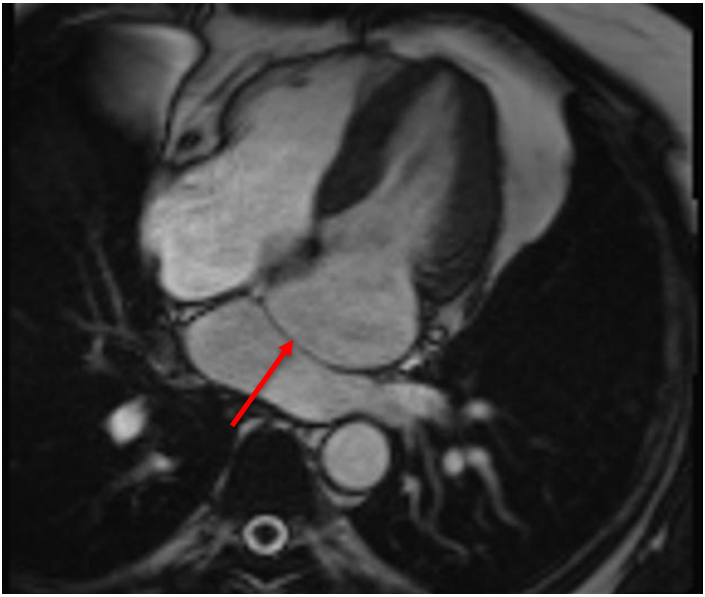
Echo showed:

- A linear membrane traversing the left atrium, suggestive of Cor Triatriatum
- Normal biventricular function
- No other abnormalities



CMR confirmed:

- Non-restrictive type of Cor Triatriatum with no other associated congenital anomalies



Cor Triatriatum CMR

MANAGEMENT AND DECISION-MAKING

The Management options included:

- Medical management, observation, and periodic follow-up
- Surgical correction
- Catheter intervention

After a detailed evaluation, the patient was advised Stress Test, which was negative for reversible Myocardial Ischemia and the patient was managed medically without any intervention with periodical follow-up.

FOLLOW UP

The patient was treated conservatively with medical management. He became asymptomatic after a few days of treatment. Subsequent follow-up visits didn't show any worsening of signs and symptoms.

At 6 months of follow-up, the patient is doing well and is asymptomatic at rest and on exertion.

DISCUSSION

Although Cor Triatriatum is very rare (0.004% in the general population and 0.1-0.4% of all congenital heart anomalies), it can sometimes be detected as an incidental finding in adults.

The presentation of Cor Triatriatum can range from acute illness to asymptomatic incidental detection and depends on the following three types of Cor Triatriatum:

1. Type 1 – No opening in the accessory membrane
2. Type 2 – One or more small restrictive openings resulting in blood flow obstruction
3. Type 3 – Large, non-restrictive opening in the membrane

Type 1 and 2 are usually symptomatic early in life and can be detected early. Patients with Type 3 are usually asymptomatic till late in life.

In patients with incidental findings of Cor Triatriatum and presenting with non-cardiac signs and symptoms, it's easy to conclude that there is no association of Cor Triatriatum to the disease.

For patients presenting with symptoms that can be of cardiac origin, like chest pain in this case, this finding needs careful evaluation to confirm the diagnosis of Cor Triatriatum and its subtype, ascertain if the symptoms are due to Cor Triatriatum, and decide the optimal line of management.

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A Comprehensive Review to Surgical and Orthobiologic Management of Joint Degeneration and Osteoarthritis

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Orthopaedics (Specialist)
Aster Hospital, Muhaisnah, Dubai

INTRODUCTION

Osteoarthritis (OA) is a common degenerative joint disease with a high prevalence and disability rate among older individuals (1,2). This condition impairs movement and causes pain characterized by deteriorating articular cartilage, abnormalities in periarticular and subchondral bones, and inflammation of the synovial membrane (3). While factors such as age, obesity, trauma, and genetic variations contribute to its onset and progression, the exact cause remains complex (2). Diagnosing OA requires a comprehensive approach including physical examinations, laboratory tests, and imaging techniques like X-ray or magnetic resonance imaging (4).

The multifaceted management of this condition traditionally combines pharmacological treatments to alleviate pain and inflammation, along with surgical interventions in severe cases to repair or replace compromised joints (5). However, these interventions may not fully halt disease progression or restore joint function over the long term (5). In response to these challenges, orthobiologics has emerged as a promising area in OA therapy which includes stem cells, platelet-rich plasma and growth factors aimed at relieving pain inflammation while supporting the body's innate healing mechanisms within affected musculoskeletal tissues (3).

This article provides an overview of OA management, covering conservative and surgical approaches and orthobiologics.

TREATMENT FOR OSTEOARTHRITIS

Treatment for osteoarthritis aims to reduce pain and inflammation, decrease stiffness, and enhance or maintain joint function (6). Over time, numerous treatment options have been developed to achieve these goals, with new approaches constantly emerging (6). These options can be categorized into

non-surgical methods such as physical therapy and lifestyle modifications, support devices like knee braces, surgical interventions including knee replacement surgeries, and orthobiologic injections (2).

NON-PHARMACOLOGICAL TREATMENT

There are two main non-pharmacological interventions in the treatment of Osteoarthritis:

- Physiotherapy
- Knee brace

Physiotherapy:

The objective of physical therapy for OA is to alleviate pain, enhance joint function, and improve the patient's overall physical condition, enabling them to regain sufficient mobility in their daily activities (7). Common approaches include aerobic exercise, resistance training, acupuncture, and yoga. Various guidelines such as the National Institute of Care and Excellence (NICE), Osteoarthritis Research Society International (OARSI), American College of Rheumatology, Ottawa Panel, and European League Against Rheumatism (EULAR) recommend different types of exercises for managing knee osteoarthritis (8–11). The effectiveness and meaningful benefits of therapeutic workout regimens are supported by multiple clinical trials and meta-analysis which demonstrate improvements in pain relief, physical function, and quality of life that can be sustained up to six months after treatment (12–14).

Knee Brace:

Knee bracing is often recommended as a supplementary treatment for knee OA (7). The suggested mechanisms of knee bracing include relieving pressure on the inner part of the knee and improving proprioception and joint stability through biomechanical and neuromuscular effects (15). These braces, known as unloader braces, may change the alignment of the lower limb to reduce stress on a specific part of the knee (15). Studies indicate that unloader braces apply an external valgus force which improves tibiofemoral alignment, shifts load away from the affected area, and reduces mechanical stress (16,17). Additionally, braces for medial knee osteoarthritis can reduce pressure on the inner joint by applying an external brace abduction moment, altering walking mechanics, and reducing activation of opposing muscles (17).

SURGICAL TREATMENT

Surgical treatment is recommended in severe cases of OA and it includes the following:

Total Knee Replacement Surgery (Total Knee Arthroplasty)

Total knee replacement (TKR) surgery requires the resection of damaged portions of the tibia and femur, replacing them with durable prosthetic components (18). This procedure is recommended for individuals experiencing significant knee pain or rigidity that hinders daily activities, as well as moderate to severe pain during rest, abnormal bowing in or out of the knee joint, and lack of improvement with other conservative treatments like corticosteroid injections or physical therapy (19).

Patients typically experience partial recovery within 6 weeks after the surgery and achieve full recovery within a year (18). A randomized controlled trial on TKR has shown that combining non-surgical treatments with TKR leads to better outcomes compared to using non-surgical methods alone in managing pain and improving function and quality of life among patients suffering from moderate to severe osteoarthritis in their knees one year postoperatively (20).

Partial Knee Replacement Surgery (Unicompartmental Knee Arthroplasty)

This surgical choice is a feasible alternative for people with localized knee joint ailment, particularly in the isolated tibiofemoral compartment (either medial or lateral) (18). Definitive contraindications include anteroposterior instability of the

knee, while greater deformity and BMI > 35 are regarded as relative contraindications (19). This technique requires smaller incisions than TKR, enabling earlier hospital discharge and faster resumption of normal activities (18).

Knee Distraction

Knee joint distraction (KJD) is a joint-preserving procedure for younger patients with OA, where the knee joint is temporarily fully unloaded by the distraction of the tibia and femur, using an external fixation frame (21). The technique has shown progressive and sustained pain reduction, functional improvement, and repair of cartilage tissue (21). Most patient-reported outcomes following KJD demonstrated significant improvement in both the short-term (1 to 2 years) and intermediate-term (5 years) post-treatment periods (21). According to Wiegant et al., the mean WOMAC score improved by more than 30 points (from 45 to 77) in 20 patients (22).

Realignment Osteotomy

Osteotomy is usually indicated as a corrective measure for large extraarticular deformities, such as those affecting the valgus or varus, relieving pain and improving alignment as well as biomechanical load transfer in knee joints (23). Osteotomy around the knee (OAK) has also been proven to reduce joint pain, enhance joint function, preserve the anatomical structure of joints for proprioception preservation, and enable rapid recovery of joint functionality (23). This ultimately helps in delaying the progression of osteoarthritis - making it well-suited for relatively young and highly active patients (23). Most of the literature focuses on high tibial osteotomy (HTO) for medial compartment OA (23). It suggests that both medial open wedge and lateral closed wedge HTO can effectively alleviate pain and restore functionality, with a survival rate of 95%–98% at 5 years and 56%–71% at 15 years (24).

Cartilage Repair and Reconstruction

Numerous surgical methods have been developed to treat specific cartilage imperfections. Surgical approaches for cartilage include symptom management (chondroplasty and debris clearance), repairing (perforation and microfracture), or restoring (autologous chondral cell transplant, osteochondral autograft, and bone-cartilage allograft) techniques (25).

These are a few widely used surgical techniques for cartilage repair and reconstruction:

- **Microfracture**

It is the most commonly used method for restoring cartilage using bone marrow stimulation. This procedure involves administering stem cells, growth factors, and platelets from the bone marrow to form a fibrin clot (25). Over time, this clot transforms into fibrocartilage rather than the typical hyaline articular cartilage (25). Microfracture may be recommended for addressing small (≤ 2-3 cm^2) full-thickness chondral lesions and in some cases, it may be used to treat larger lesions (≥ 2.5-3 cm^2) in older individuals with lower physical demands (25).

- **Osteochondral Autograft Transfer (OAT)**

OAT provides a significant advantage over microfracture by replacing chondral defects with healthy hyaline articular cartilage (25). The procedure involves extracting a portion of normal cartilage and bone from an area of the joint that does not bear weight, which is then strategically positioned to fill the defect (25). OAT is particularly advantageous for addressing osteochondral defects, including smaller lesions of osteochondritis dissecans that are not suitable for primary fixation (25). It makes use of the patient's own tissue and eliminates the risk of transmitting infectious diseases associated with allografts (25). This technique is most appropriate for treating defects ranging from 1 to 4 cm^2 in size; however, larger lesions up to 8 to 9 cm^2 can also be addressed using multiple plugs, although this raises the risk of donor site morbidity (25).

- **Osteochondral Allograft Transfer (OCA)**

This procedure involves using size-matched cadaveric donor plugs to immediately restore the structural integrity of the joint's articular surface (25). The use of cadaveric grafts avoids complications at the donor site and enables treatment of larger lesions (> 2-3 cm^2) (25). OCA presents a feasible option for addressing substantial chondral and osteochondral defects exceeding an area > 2 to 3 cm^2, making it suitable for treating articular defects in different areas such as femoral condyle, trochlea, or patella not only in young individuals with high activity levels but also in older patients with lower demands on their joints (25).

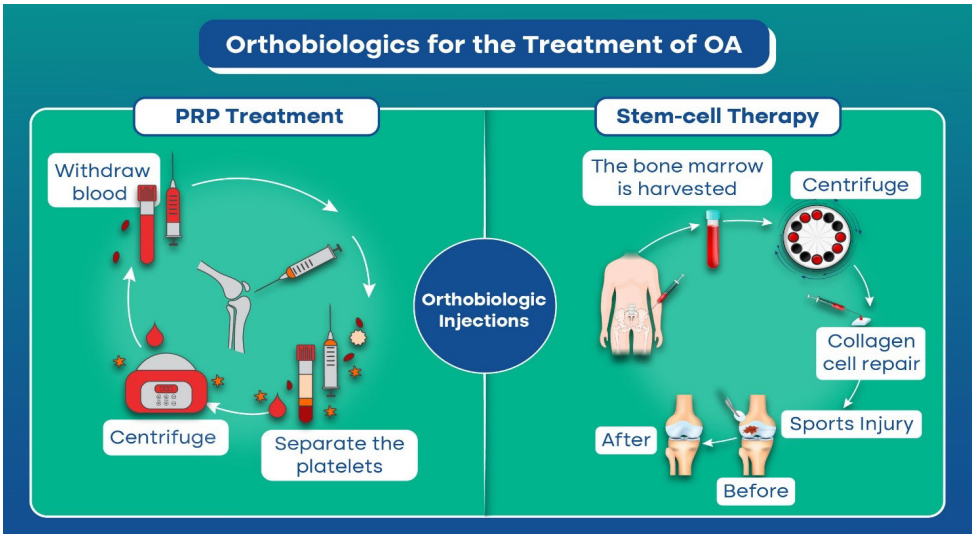
Meniscal Repair and Transplantation

Meniscus repair is typically recommended for active individuals under the age of fifty who are experiencing discomfort near the tibiofemoral joint line or for those in their fifties who maintain a high level of physical activity (26,27). But, not all meniscus tears can be repaired, especially in cases of significant damage (26). In such cases, meniscus transplantation might restore load-bearing capacity and

alleviate symptoms while offering protective effects for the cartilage (27). Practical prerequisites include adequate axial alignment and a stable joint, as well as at least 2 mm of visible tibiofemoral joint space on weight-bearing PA radiographs taken at a 45° angle to determine eligibility for this treatment option(27).

ORTHOBIOLOGICS INJECTION

Orthobiologic injection treatments for the knee are an emerging and rapidly developing area that include stem cells, platelet-rich plasma, and various growth factors (3). These therapies aim to facilitate healing processes and reduce inflammation to alleviate pain or stimulate healing within musculoskeletal tissues by influencing the biological surroundings at a specific site affected by injury or degeneration (3).



Platelet-Rich Plasma Injection

Platelet-rich plasma (PRP) is a blood preparation with a higher platelet concentration than whole blood, obtained by collecting venous blood and centrifuging it in a clinical setting (28). There are two subtypes of PRP: leukocyte-rich PRP and leukocyte-poor PRP, distinguished based on the neutrophil concentration relative to that found in peripheral blood (28).

A network meta-analysis of 9 studies comparing these subtypes concluded that LP-PRP offers greater clinical benefit compared to placebo, showing improved Western Ontario and McMaster Universities Osteoarthritis Index scores (WOMAC)

and VAS (29). It was observed that WOMAC and VAS scores significantly improved across all three groups at the earliest follow-up period of 3 months (29). However, at subsequent time points (6, 9, and 12 months after treatment), the group receiving leukocyte-poor PRP exhibited notably lower WOMAC scores along with decreased VAS scores specifically at the 12-month mark (29).

Stem-cell Therapy

Stem cells have the capacity to release cytokines that can help alleviate certain types of inflammation (18). Types of stem cells that help to regenerate cartilage include embryonic stem cells (ESCs), induced pluripotent stem cells (iPSCs), and mesenchymal stem cells (MSCs) (18). ESCs and iPSCs are inherently pluripotent and capable of differentiating into multiple cell types including chondrocytes (18). While studies have demonstrated the differentiation of chondrocytes from ESCs and iPSCs, these forms of stem cells carry potential risks such as teratoma development and immunogenicity (30).

On the other hand, MSCs may be particularly promising due to their propensity to develop into chondrocytes along with their potential role in preventing apoptosis of these cartilage-forming cells and halting overall degenerative processes through paracrine mechanisms (18).

Key Highlights

- Osteoarthritis (OA) is a prevalent degenerative joint disease that causes pain and mobility issues, primarily affecting older populations (1,2).
- Traditional management includes pharmacological treatments for pain and inflammation, and in severe cases, surgical interventions like joint repair or replacement (5). However, these may not stop disease progression or fully restore joint function (5).
- Orthobiologics, an emerging field in OA therapy, employs stem cells, platelet-rich plasma, and growth factors, enhancing natural healing and reducing inflammation (3,6).

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Navigating Rarity: Enhancing Outcomes in Submandibular Pleomorphic Adenoma Cases at Aster Hospital, Sharjah

Dr. Sandeep Janardan Tandel
General And Laparoscopic Surgery (Specialist)

PRESENTATION

- 40 year old female
- Admitted with:
  - Swelling in the right submandibular region for 7 to 8 months rapidly increased in size from last 2 months
  - Pain associated with swelling
  - Pain score around 5 to 6

FINDINGS

During Examination:

- Firm to hard right submandibular area mass around 4x4 cm
- Mild tenderness
- Non-mobile
- Multiple other lymph nodes in the neck, palpable
- Parotid right side appeared normal
- No mass felt in left submandibular region

Bidigital Examination:

No stone felt and no mass was seen in the floor of the mouth.

FNAC (Fine Needle Aspiration Cytology):

We received ten stained cytology slides labelled with patient's name and reference number (FN-29-24 HE, PAP, GIEMSA, and MGG).

Microscopic Examination:

Aspirate was richly cellular, showed abundant myxoid matrix, bland ductal epithelial cells, and myoepithelial cells. Background showed red blood cells and a few adipocytes.

DIAGNOSIS

FNAC of the Right Submandibular Region showed:

- Milan System Category IV A
- Neoplasm: Benign, Pleomorphic Adenoma

DURING PROCEDURE

- Patient was placed in a supine position with neck turned to left side and neck extension given for exposure.
- Parts were prepared with an antiseptic solution and sterile drapes were placed.

Incision and Flap Elevation:

- Along the relaxed skin tension lines, a horizontal incision was made at two fingerbreadths below the mandible to ensure the marginal mandibular nerve was not damaged.
- Incision was carried down through the platysma to expose the sternocleidomastoid muscle's anterior border posteriorly and the digastric muscle's anterior belly.
- The posterior inferior aspect of the submandibular gland was identified immediately anterior to the sternocleidomastoid muscle, overlaying the posterior belly of the digastric muscle.

Marginal Mandibular Nerve Preservation:

- Elevation of the fascia of the submandibular gland from an inferior to the superior direction that carries the marginal mandibular nerve superiorly away from the gland was done.
- The marginal mandibular nerve was identified, dissected, and elevated superiorly above the mandible. The use of the nerve stimulator facilitated the identification of the marginal mandibular nerve through stimulation.

Gland Removal:

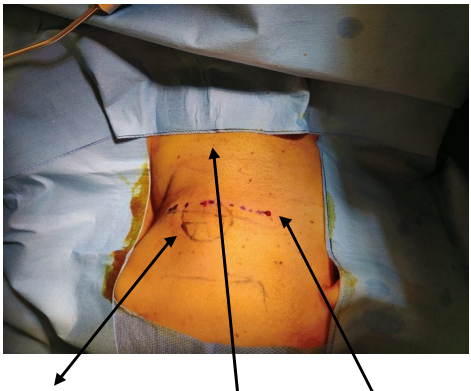
- Following the flap elevation, the gland was exposed and retracted inferiorly, employing a Babcock for traction.
- The digastric muscle, including the common tendon and the anterior belly, was identified along its course.

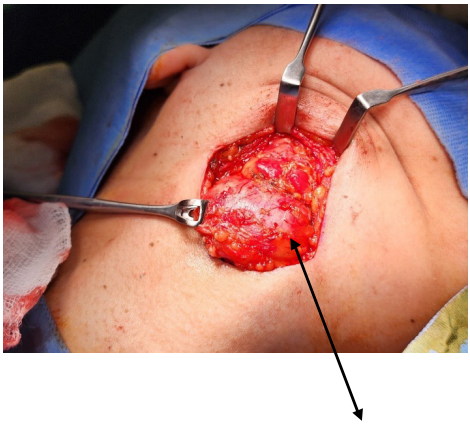
- The anterior aspect of the gland was mobilized posteriorly to expose the mylohyoid muscle.
- A Langenbeck retractor was placed under the posterior border of the mylohyoid muscle to retract anterosuperior and expose the lingual nerve.
- Bipolar cautery was placed on the submandibular ganglion, permitting separation of the gland from the lingual nerve.
- The gland's duct was traced anteriorly and transected after placement of the artery clamp as distal as possible.
- The gland was dissected posteriorly to encounter the branch from the facial artery perfusing the gland.

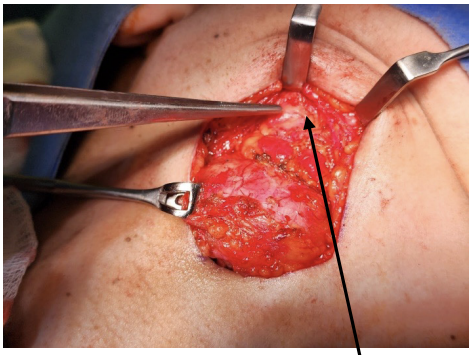
The facial artery was left intact with suture ligature of the multiple branches to the gland from the facial artery. The hypoglossal nerve was identified and stimulated to confirm and preserve Closure.

- The wound was irrigated with saline and closed in layers over drain no. 8.
- 3-0 Monocryl was used for subcutaneous and skin suturing.
- Instrument and gauze count checked.

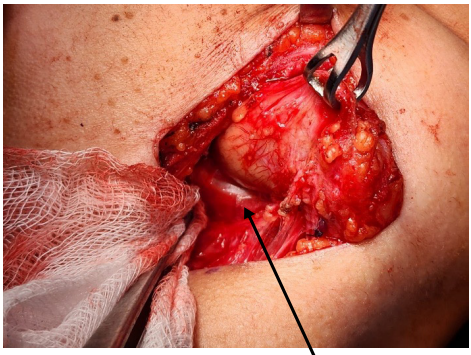
Intra-operative Images



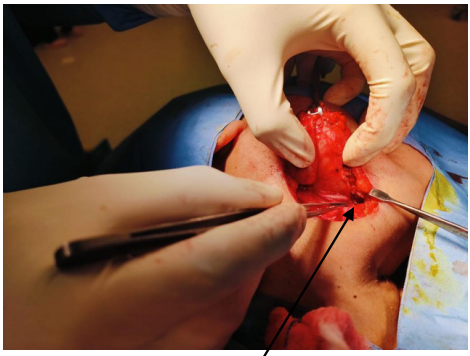




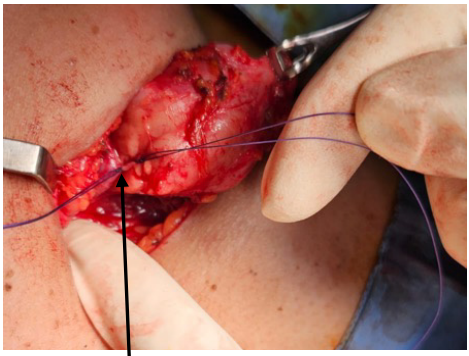
Marginal Mandibular Nerve



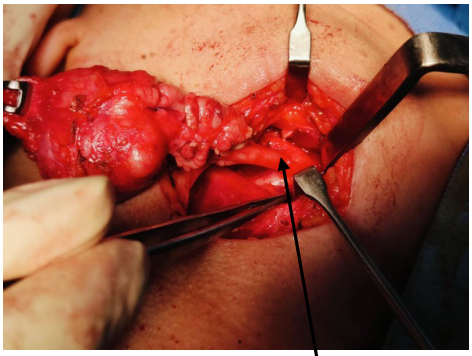
Digastric Muscle Tendon



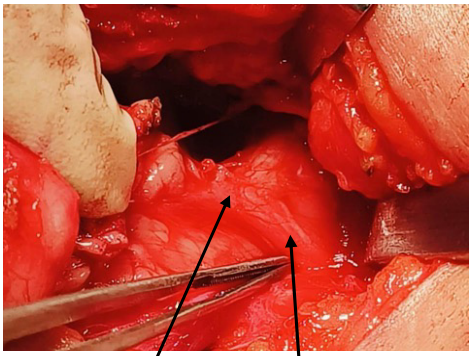
Hypoglossal Nerve



Facial Artery Branch to Submandibular Gland ligated and Facial Artery preserved

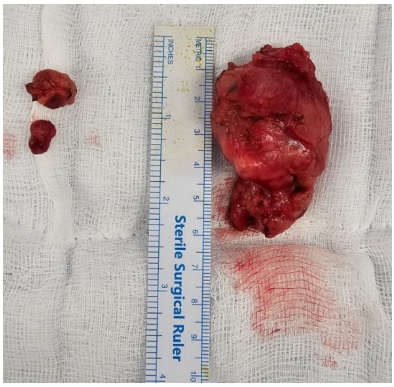


Wharton Duct



Submandibular Ganglion Area

Lingual Nerve



Submandibular Gland with two Submandibular Lymph Nodes

POST PROCEDURE

The patient tolerated the procedure well, with no complications. The post-operative period was uneventful, and the patient was discharged in a stable condition.

HISTOPATHOLOGY REPORT

Submandibular Gland Excision:

- Pleomorphic Adenoma, margins were negative for tumour (completely excised).
- Two reactive lymph nodes with acute inflammation and haemorrhage.
- Negative for malignancy.

DISCUSSION

The occurrence of pleomorphic adenoma in the submandibular gland is notably infrequent, with recent data indicating only 8% of cases within the submandibular and sublingual gland group. Despite its rarity in this particular location, managing such cases requires heightened attention due to potential complications.

While encountering pleomorphic adenoma in the submandibular gland poses unique challenges, timely intervention coupled with meticulous surgical techniques can significantly mitigate risks and optimize patient outcomes. Employing gentle dissection methods is paramount to preserving vital structures and minimizing postoperative complications. Furthermore, integrating advanced technologies like nerve monitoring can further enhance surgical precision, ensuring the preservation of critical nerves and facilitating a smoother recovery process for patients.

CONCLUSION

Although the incidence of pleomorphic adenoma in the submandibular gland remains infrequent, prioritizing prompt intervention, employing meticulous surgical techniques, and leveraging advanced technologies are crucial strategies to achieve optimal outcomes and mitigate potential risks for patients undergoing treatment for this rare condition.

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Left Atrial Appendage (LAA) Closure Device in Chronic Atrial Fibrillation - Indications, Techniques, and Outcomes

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INTRODUCTION

Atrial fibrillation is the leading cause of arrhythmia in the world, responsible for strokes, heart failure, and cardiovascular disease (1). The estimated prevalence of atrial fibrillation is around 46.3 million worldwide and is predicted to increase fivefold in the next 40 years, especially in the United States (2,3). Atrial fibrillation increases the risk of thromboembolic stroke nearly five fold (4). Due to the morphology of the left atrial appendage (LAA), it is more prone to thrombus formation in patients with non-valvular atrial fibrillation (5,6). Standard treatment approaches warfarin and novel anticoagulants, however they have several limitations like bleeding and poor compliance (6). LAA closure has emerged as an alternative therapeutic approach to drug therapy (7).

This article discusses in brief, the pharmacological treatment as well as LAA closure devices to prevent atrial fibrillation related strokes.

LEFT ATRIAL APPENDAGE CLOSURE DEVICES:

Occluding the LAA reduces the risk of stroke in patients with atrial fibrillation (6). There are several kinds of LAA closure devices, which are deployed by means of endovascular or epicardial approach (8). The most studied LAA closure devices include the PLAATO system (ev3 Endovascular, Plymouth, MN), the WATCHMAN device (Boston Scientific, Plymouth, MN), the Amplatzer Cardiac Plug (ACP, St. Jude, Golden Valley, MN), and the LARIAT device (SentreHEART, Palo Alto, CA) (9).

These closure devices are indicated for patients who are contraindicated to anticoagulant therapy and have a high risk of bleeding (6).

The characterization and placement of LAA device is made with the help of cardiac computed tomography (CCT), cardiac magnetic resonance (CMR) and trans echocardiography (TEE) (6).

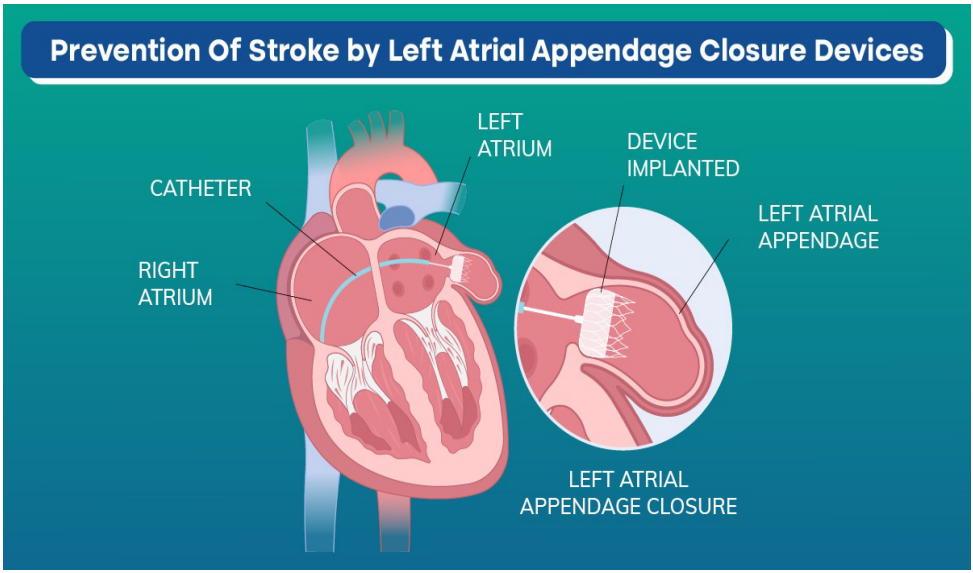

Figure 1: Left Atrial Appendage Closure Devices to Prevent Thrombus

1. Imaging of the Left Atrial Appendage:

Cardiac imaging is important tool for LAA anatomical characterization and device placement (6). Measurements of the LAA orifice diameter is essential to ensure the correct sizing of the occlusion device to optimize effectiveness and minimize complications (6). The imaging modalities include cardiac computed tomography, cardiac magnetic resonance, and trans echocardiography (6).

3D TEE provides more precise values than 2-D TEE (10). TEE or intracardiac echocardiography (ICE) is used to ensure the absence of LAA thrombus and to obtain left atrial (LA) access through a transseptal puncture (6). Once the device is in the left atrium, TEE, ICE, and/or fluoroscopy guidance are necessary to position the device in the LAA (11).

2.LAA Anatomy:

The LAA is a finger-like outgrowth on the left atrial (LA) wall, that develops in the 4th week of embryo development as an embryonic remnant of the left atrium (12). The LAA is composed of two lobes in half of the population and three lobes in one-third of the population (6). The four most common morphologies of LAA are the chicken wing (48%), cactus (30%), windsock (19%), and cauliflower (3%) (6). The morphology of the LAA is predictive of ischemic attack and risk of stroke (6).

Following is the representation of the four common morphologies of the LAA:

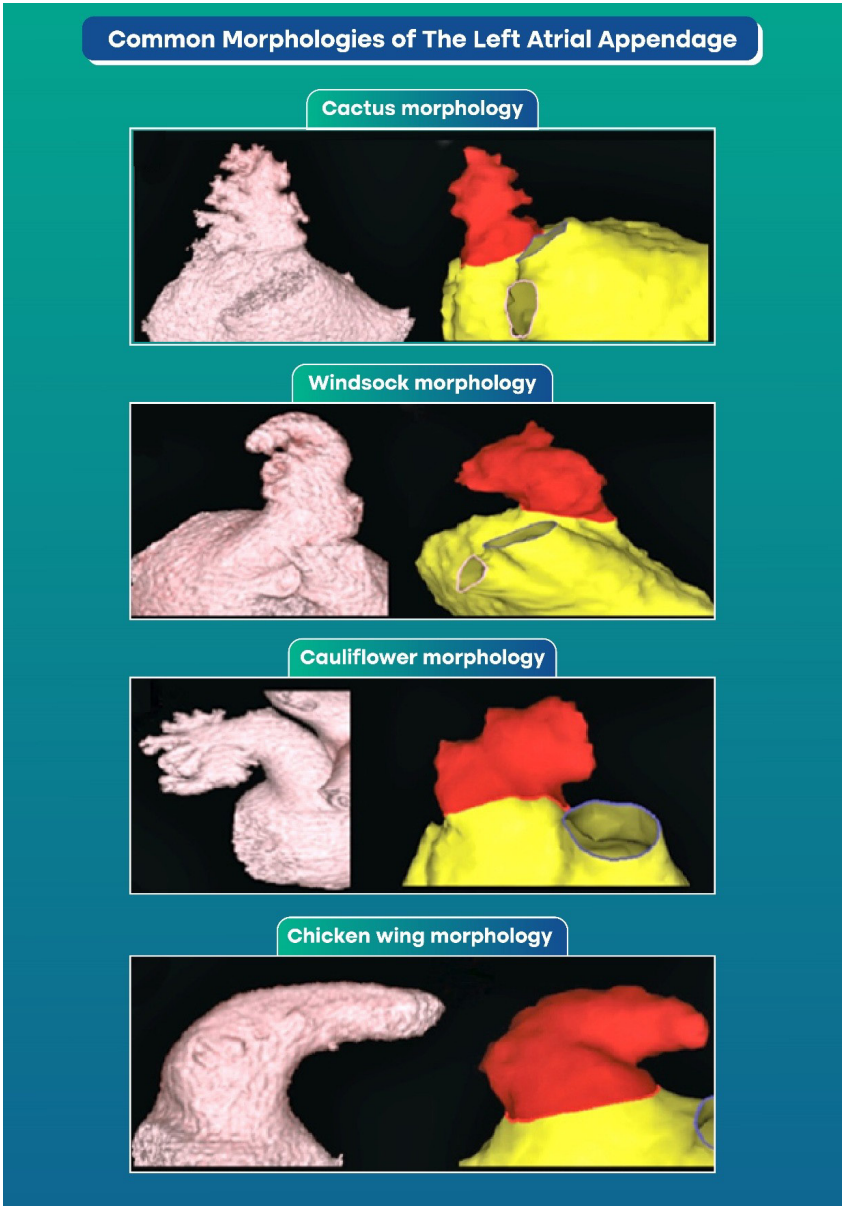

Figure 2: Left Atrial Appendage Morphologies

3. How is LAA Associated with Atrial Fibrillation?

During normal sinus rhythm there is good blood flow, however when atrial fibrillation occurs there is reduced blood flow velocity and the LAA appendage becomes a static pouch (13). The blood flow stasis along with heterogenous LAA morphology increases the chances of thrombi formation at the appendage (13). Thromboembolic events and stroke remain the most feared complication of atrial fibrillation (6).

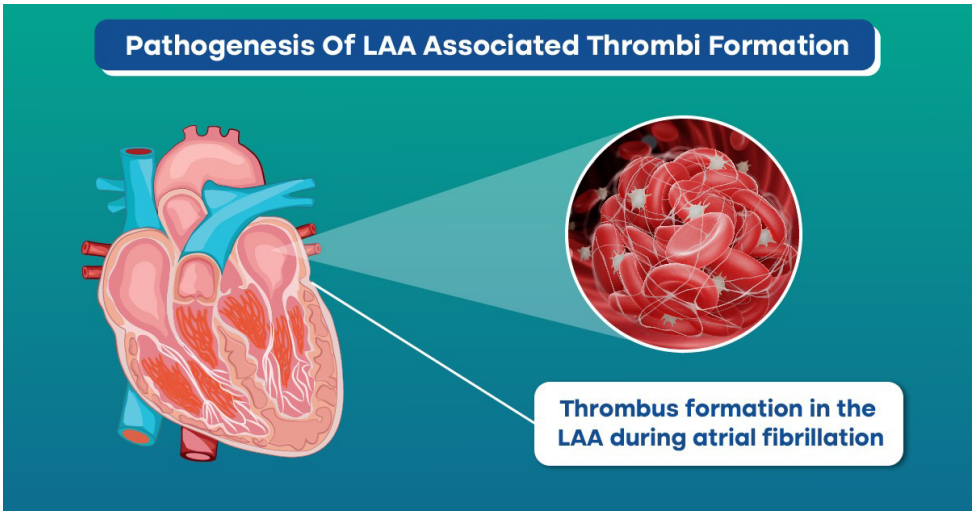

Figure 3: Role Of LAA In Thrombi and Stroke in Atrial Fibrillation

4. Indications for LAA Devices:

As per the expert consensus statement by the EHRA/European Association of Percutaneous Cardiovascular Interventions, there are five patient categories in whom the risks and benefit of LAA closure can be considered (14):

1. The first indication of using LAA closure devices is for preventing the risk of stroke in patients with a CHA2DS2- VASc ≥ 2 in men and more than ≥ 3 in women (14). Patients in whom oral anticoagulants (OACs) are contraindicated due to history of bleeding (e.g. intracranial or life-threatening bleeding) (14).
2. The second potential indication is stroke prevention in patients at high thrombo-embolic risk (CHA2DS2-VASc ≥ 2) and increased bleeding risk associated with systemic anticoagulants (14):

- Patients with HAS-BLED score ≥3 (14).
- Patients with prolonged triple anticoagulant therapy and antiplatelet therapy for severe coronary artery disease treated with stents (14).
- Patients with renal dysfunction and creatinine clearance of 15–30 mL/min can be indicated for closure devices (14).

The decision of LAA closure device implantation in these groups is determined based on individual risk-benefit evaluation, however, novel OACs are still the main treatment strategy (14).

3. The third potential indication for LAA closure is using the device as an alternative to OACs in patients who are eligible for OACs in whom there is no increased risk of bleeding. This group represents only a small minority of current LAA closure procedures (14).
4. The fourth possible indication for LAAO is in patients with embolic events despite adequate OAC after other plausible causes (e.g. carotid disease) have been excluded (14).
5. The fifth potential indication for LAAO is in patients at high thrombo-embolic risk (CHA2DS2-VASc ≥ 2) undergoing pulmonary vein isolation who wish to discontinue OAC after AF ablation (14).

5. Techniques For LAA Occlusion: Percutaneous LAA Closure

Presently there are three different strategies for LAA exclusion, these methods can be grouped as interventional/percutaneous (endocardial, epicardial) or surgical approaches (15).

In the percutaneous endocardial approach, transeptal access is gained through the femoral vein (15). Thereafter the delivery sheath is exchanged after transeptal puncture guided by LAA anatomical visualization with angiography and TEE (15). An appropriately sized device is then released in the landing zone, TEE and fluoroscopy can be used to confirm the correct positioning of the device (15).

TYPES OF LEFT ATRIAL APPENDAGE CLOSURE (LAAC) DEVICES:

The different types of LAA closure devices are discussed below in detail:

Figure 4: Devices for Left Atrial Appendage Occlusion (16)

i. Watchman Flx Device

Watchman device is the most studied device of the Watchman family, with the Watchman Flx being the latest addition (17). It is made of a self -expanding nitinol frame, fixation barbs and permeable polyethylene terephthalate (PET) fabric cover (18). It is available in five different sizes: 21, 24, 27, 30, and 33 mm in diameter and height (18). The device has the advantage of being fully recaptured, repositioned, and redeployed for proper placement (17).

The pooled meta-analysis of the PROTECT-AF trial and PREVAIL trial has demonstrated a 2.85% incidence of cardiovascular death, stroke, or systemic embolism in the device group versus a 3.4% incidence in the warfarin group with non-procedure related bleeding in 1.7% of the device group and 3.6% in the warfarin group respectively (19).

ii. LAmbre Device:

The LAambre device has a hook embedded umbrella connected to a short central waist (6). This device is also self-expandable with a polyethylene terephthalate

cover on the umbrella which is 4-6mm larger (6). This device size ranges from 16-36mm (6). The LAmbre device are available in two types standard type for single and double loop anatomy and special for multilobed or small LAAs (20). The small delivery sheath reduces the risk of thrombosis, cardiac tamponade, perforation and puncture injury (21).

In a study evaluating patients who underwent LAA closure with LAmbre device showed successful placement in 100% patients, complete sealing was seen in 94.4% patients, with 1.6% of the patient suffering from ischaemic attack and minor bleeding in 5% of the patient population (21).

iii. LARIAT Device

The LARIAT device is implanted by a combination of epicardial and endovascular approach for LAA closure (18). The system consists of a balloon catheter, magnet tipped guidewires and an epicardial suture delivery device (18). This device is closed off from the outside, leaving no endovascular hardware within the body (18). This reduces the risk of device related emboli, thrombus formation and risks of infection and doesn't require the use of anticoagulants (18,22).

A prospective, single-center study of 52 patients who underwent LAA closure with LARIAT DEVICE versus 75 patients with anticoagulant therapy showed no significant difference (23). There was a 2.7% incidence of ischaemic stroke and 1.3% incidence of thromboembolic events in the anticoagulant therapy group and annual mortality rate of 1.95 in the LARIAT group versus 0.9% in the drug treatment group (23).

iv. Ultraseal Device

The second generation Ultraseal occluder has a high rate of success and low procedural complications (24). It is a self-expandable device composed of a bulb, proximal sail, and an articulating joint (24). The second-generation device is devoid of the central post making the bulb flexible with decreased radial force and an inversion of the sail cover (24). It is available in sizes ranging from 11mm to 34mm and length of 10-188mm (17).

v. Amplatzer Amulet Device:

This is the new-generation device following the earlier Amplatzer Cardiac Plug (ACP) (17). It is a self-expandable nitinol device made up of a lobe centrally connected to the disc by the waist (17). The ACP2 comes preloaded in the delivery system with a lobe diameter of 16-34 mm (18). This device is recommended when

it is 6-4 mm larger than the LAA orifice (18). ACP2 differs from ACP1 in that the lobe and disk are larger with more hooks and stiffer built (18).

In a study with 1088 patients, 1078 (99.1%) patients were successfully implanted with ACP2 device (25). The rate of ischaemic stroke, systemic embolism, or CV death at 2 years was 8.7% and a 67% reduction of the CHA2DS2-VASc predicted rate of ischaemic stroke (25).

vi. Conformal Left Atrial Appendage Seal:

The Conformal Left Atrial Appendage Seal (CLAAS) overcomes the functional limitations of the first-generation devices (7). The CLAAS device is a flexible foam-based matrix that provides a highly conformable implant that can adapt to the LAA morphologies and provide complete sealing (17,26).

The device endoskeleton has two rows of anchors, and the porous foam cup provides a suitable surface for tissue ingrowth from the LAA (26). The CLAAS device can adapt to large range of sizes by providing just two sizes: 13 mm to 32 mm mean diameter (26). The CLAAS implant can close the LAA even when off axis and doesn't require precise orientation into the LAA ostium (26). The smooth LAA facing surface, removable tether, and strong suture with perforations for blood flow prevents device embolization (26).

The CONFORMAL Early Feasibility Study explored the clinical experience of the CLAAS device in a population of 22 patients. 18/22 (81.8%) patients were successfully implanted with the CLAAS device with successful closure in 17 (94.4%) patients (7). The study reported no additional periprocedural strokes, major pericardial effusions, or systemic or device embolization on further follow up (26).

Types of Percutaneous Left Atrial Appendage Closure Devices

Device	Design	Sizes (mm)	Features
Watchman FLX Device	Single lobe; nitinol cage with PET membrane and fixation barbs.	21, 24, 27, 30, and 33	· It can be fully recaptured and redeployed.
Amplatzer Amulet Device	Lobe and disk connected to a longer waist with polyester patch for occlusion.	16 to 34	· Fully preloaded, wider diameters, low-profile end screw to reduce thrombus. · It has increased stability and re-capturing.
LAmbre LAA closure system	Lobe (umbrella) and disk (cover) connected to a waist. Covered with double PET membrane; double stabilization mechanism (8 distal hooks, 8 proximal U-shaped anchors).	16 to 36	· Special device for multilobed, small or chicken wing anatomies.
Ultraseal	Expandable nitinol device with a distal bulb (lobe), sail (disk) and articulating joint.	16 to 32	· Fits in complex LAA anatomies because of the multidirectional articulating joint and flexibility.
LARIAT	Endo-epicardial approach; consists of occlusion balloon, magnet-tipped guidewires and epicardial snare with a pretied Teflon-coated suture delivery device.	16 to 32	· Fits in complex LAA anatomies because of the multidirectional articulating joint and flexibility.
The Conformal Left Atrial Appendage Seal (CLAAS)	Nitinol skeleton covered with a porous conformable foam and two rows of anchors.	27 to 35	· The porous foam cup provides a thromboresistant surface and the anchors show stability.
Newer Devices Under Evaluation			
WaveCrest	Single lobe device with nitinol frame and LA-facing (PET) layer. It has 10 bidirectional anchors and 10 single anchors	22, 27, and 32	· Suitable for small LAA anatomies. · The occluder and anchor can be independently manipulated.
Sideris Transcather Patch	Frameless polyurethane foam tailored patch delivered with a bioabsorbable balloon. Surgical glue is used in the distal end.		· Bioabsorbable and no risk of perforation.
LeFort device	Expandable nitinol frame with PET covering and fixation barbs.	21 to 33	· Currently under evaluation
Sierra Ligation System	Epicardial device with an appendage grabber with electrodes and ligator; ECG navigation	15 to 25	· Single subxiphoid access. · No transseptal puncture is needed. · Electrodes help in identifying electrical activity.
Pfm device	Dual disk; nitinol; primary distal anchor, middle connector and proximal occluder with secondary anchor	15 to 25	· Barbless anchor reduces risk of perforation. · Adjustable connector can adapt to different LAA sizes.

Table 1: Types of LAA Closure Devices (6, 20, 27)

6. Complications in LAA Closure Devices:

Complications encountered with LAA closure devices can be either access related or device implantation related complications, some of the complications are listed below:

i. Access Related Complications:

Due to the large size of the sheath patients are at risk of groin hematomas, pseudoaneurysm in the femur, and femoral arteriovenous fistula, retroperitoneal bleed requiring transfusions and surgical interventions are the most common access-related complications (0.6-13%) (15). Elderly patients and patients with frail a tortured vascular anatomy have a higher risk (15).

ii. Device Related Complications:

As mentioned above the large size of the delivery sheaths increases the risk of air embolism and peri-procedural stroke/transient ischemic attack or ST-segment elevation, and pericardial effusion and cardiac tamponade (15).

Other complications of device implantation include cardiac perforation, device migration and dislodgement (15). There are chances of traumatic damage to adjacent structures of the heart, including the pulmonary artery, left pulmonary veins and the circumflex coronary artery (15). Sometimes the complex LAA anatomies cause a mismatch between the device size and the LAA size causing incomplete occlusion and residual per-device leak (15).

Implanting LAA closure devices is a learning curve, that is inversely related to the rate of complications (15). The incidence of complications decreases as operators gain more experience (15).

Following image shows an example of device related complication of thrombosis:

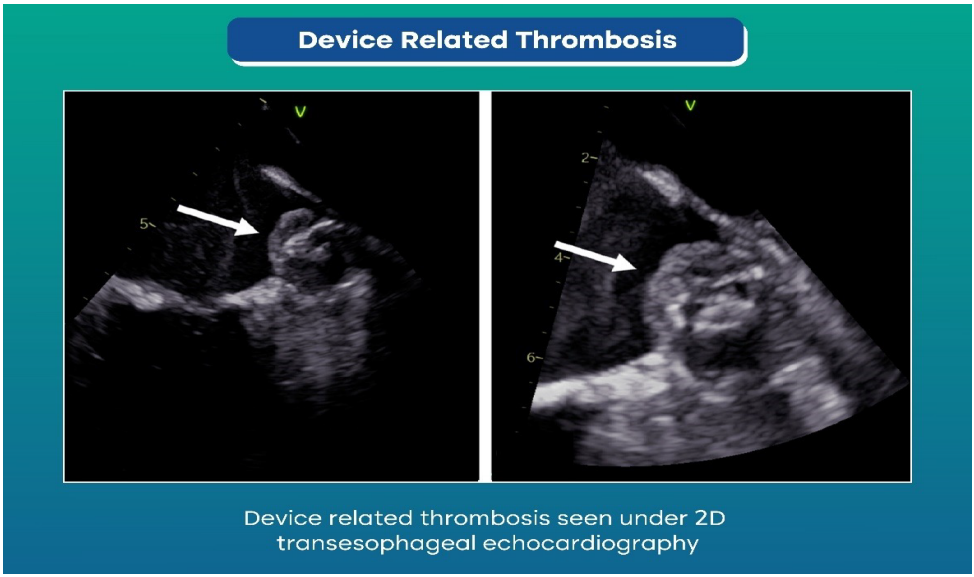

Figure 5: Device Related Thrombosis Visualized by TEE (16)

7. Post Implant Antithrombotic Treatment-related Complications:

Device-related thrombosis after device implantation occurs in 2% to 5% of patients, the number varies depending on the device type and timing of imaging (28).

Post-device implantation management is not well standardized and there are several treatment algorithms established (15). Post-procedural dual antiplatelet therapy with aspirin and clopidogrel has been suggested but the treatment duration is unclear, ranging from 1 to 6 months in different studies (15). A clear consensus about appropriate post-procedural antithrombotic treatment is lacking (15).

Key Highlights

- In atrial fibrillation, the LAA undergoes remodeling, the changes include cardiac chamber dilation, scarring, endocardial dysfunction, and the low emptying velocity lead to thrombi formation (29).
- LAA closure devices are useful in preventing thromboembolism in patients with atrial fibrillation who are contraindicated to anticoagulant therapy (6).
- These closure devices primarily occlude the LAA with an aim to prevent thrombus formation (30).
- These LAA closure devices can provide complete exclusion by adapting to the variable LAA sizes through wide device sizes available (13).

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Successful Treatment of Chronic Rupture of Achilles Tendon Caused by Repeated Corticosteroid Injections and Haglund's Deformity at Aster Cedars Hospital and Clinic, Jebel Ali

Dr. Hardikkumar S Pawar
Orthopaedics (Specialist)

PRESENTATION

- 47 year old male
- History of multiple physiotherapies for chronic pain in the left heel, along with multiple corticosteroid injections for 2 years
- No family history of medical illness
- Admitted with:
  - Pain in left ankle for a week
  - Difficulty in walking and moving the left leg
  - Deformity on the left leg

FINDINGS

During Examination:

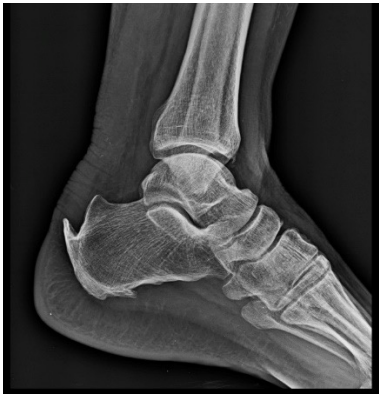
- Swelling and tenderness in the left ankle
- Palpable gap at Achilles Tendon insertion site just proximal to its insertion
- Thompson test came positive
- No distal neurovascular deficit noted

Ultrasound showed:

- Complete tear and total rupture of the left Achilles Tendon with a gap around
- Loss of tendon fibres and degenerative changes in the tendon

Ankle X-ray showed:

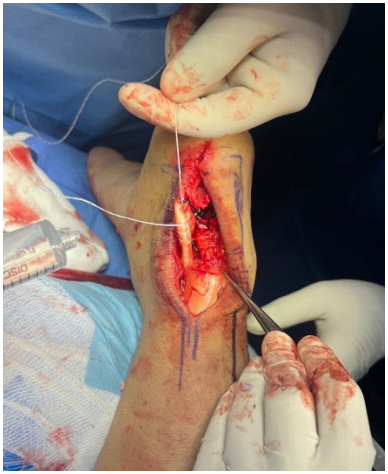
- Haglund's deformity on the left calcaneus and retrocalcaneal spur



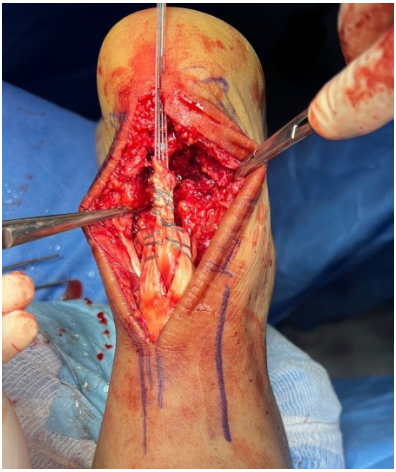
Pre-operative X-ray image

DURING PROCEDURE

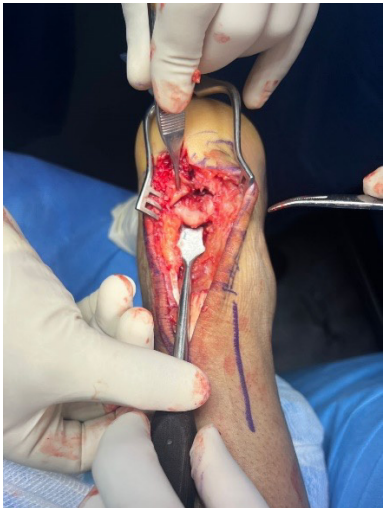
- Under general anaesthesia, painting and draping were done in a sterile manner.
- Patient was positioned in the Prone position, and the tourniquet was inflated.
- Posterior direct approach was taken.
- Tendoachilles was identified, and pathological tissues were removed.
- Haglund's deformity was seen, and a retrocalcaneal spur was identified and removed with a saw.
- Rasping was done to create a smooth crater.
- Flexor Hallucis Longus (FHL) tendon was harvested, resected, and prepared with fibre wire no. 2-0.
- Diameter of the FHL tendon was measured.
- Drill hole was made in calcaneum at a predetermined insertion site under fluoroscopy guidance.
- Tenodesis was done with the remnant of tendoachilles.
- FHL tendon with tendoachilles was passed in the tunnel and fixed with calcaneal bio screw of 8x25 mm size.
- The tension was checked during fixation.
- ROM (Range of Motion) was checked on the table.
- Stability was checked after fixation.
- Wound was washed and closed in layers.
- Splint was given in the equinus position.



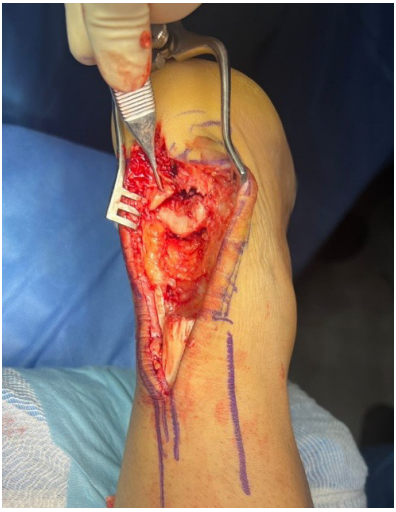
FHL Harvest



FHL with Tendoachilles Tenodesis



Retrocalcaneal Spur



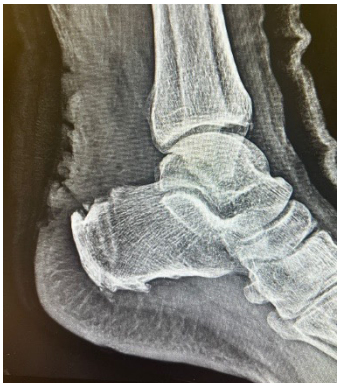
Gap after Debridement with Retrocalcaneal Spur

POST PROCEDURE

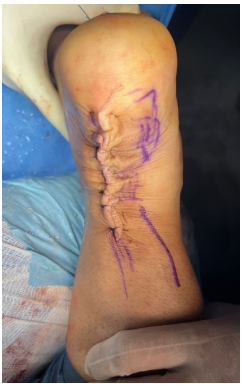
The patient tolerated the procedure well, and the post-op splint was continued in the equinus position for 2 weeks. The stitches were removed after 2 weeks, and ROM exercises were advised, along with active and passive stretching in plantar flexion and dorsiflexion for 4 weeks.

At 6 weeks, the patient was advised to do physio-rehabilitation and gait training.

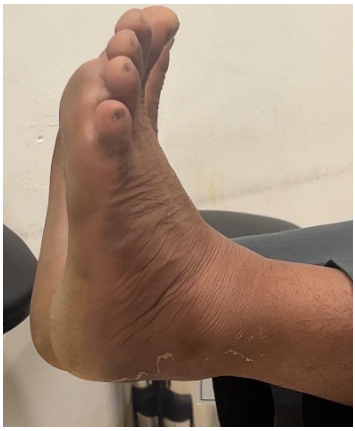
At 8 weeks, the patient was seen walking without support and pain-free with a full range of movements.

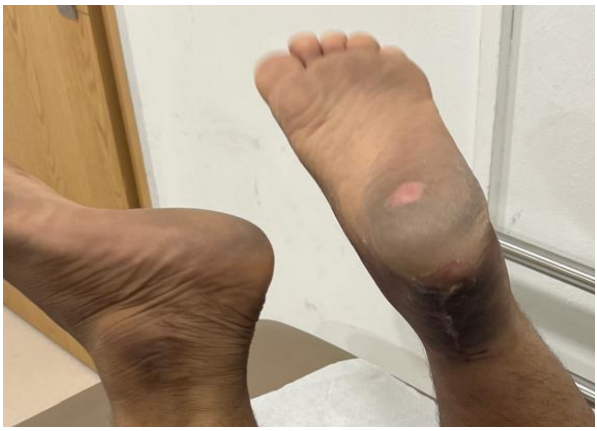


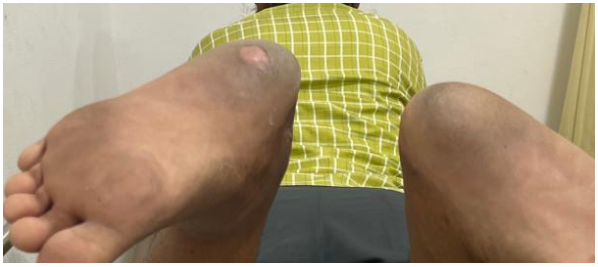
Post-surgery X-ray image

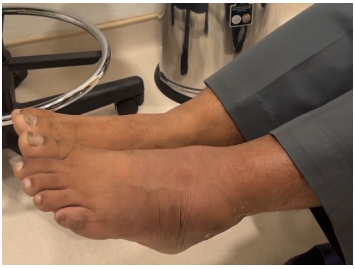


Post-op Closure









6-8 weeks post-op images showing full ROM

DISCUSSION

The Achilles Tendon is considered the most significant and strongest tendon in the human body. Nonetheless, this structure is the most frequently ruptured tendon in the lower limbs, mainly due to degenerative (25%) and mechanical / sport-related (75%) processes. Several characteristics were discovered to be significantly distinct between patients with tendinopathy and the normal population, including age, body mass index (BMI), abductor hallucis brevis muscle thickness, extensor digitorum longus muscle cross-sectional area (CSA), and both the thickness and CSA of the tibialis anterior, flexor digitorum brevis, flexor hallucis brevis, and peroneus muscles.

In elderly patients, a bony spur (osteophyte) may form at the calcaneus, causing some disruptions to the attached Achilles tendon. Haglund's deformity (an abnormality of the bone and soft tissues in the foot) may develop later in life due to an expansion of the bony section of the heel. The deformity can be detected by clinical (mainly inspection and palpation) and radiographical examinations. Open surgery (bursectomy and calcaneal exostosis resection) and endoscopic calcaneoplasty are two treatment options available for this disorder. Haglund's deformity was found to be responsible for acute Achilles tendon rupture, particularly in athletes. However, its importance has not been addressed adequately in chronic Achilles tendon rupture cases.

Early detection and treatment should be carried out properly for Achilles tendon ruptures. However, it is estimated that about 25% of Achilles tendon injuries are not detected early, resulting in a neglected condition known as chronic Achilles tendon rupture (delayed diagnosis and procedure for more than 4-6 weeks). It is primarily attributed to underdiagnosis, with the injury referred to as hematoma formation or simply an ankle sprain, especially when the patient can walk to the examination room. Chronic Achilles tendon rupture necessitates more difficult treatment due to the retraction of the tendon ends and the surrounding muscles, scar tissue development in the gap, and diminished gastrocnemius muscle contractility. Flexor hallucis longus (FHL) tendon transfer is a renowned and minimally invasive surgery for treating chronic Achilles tendon rupture cases. Some studies have reported favourable outcomes following restoring the ruptured Achilles tendon with the FHL tendon transfer procedure. Furthermore, this technique can preserve the integrity of the skin along the affected region.

Complete rupture of the Achilles tendon, traumatic or non-traumatic, is relatively rare. Non- traumatic ruptures are most often related to degenerative phenomena, which reduce the strength and elasticity of the tendon tissue over time, to predisposing factors which increase stress on the tendon and to local or systemic medication, such as fluoroquinolones and corticosteroids.

The mechanism underlying these phenomena is linked to hypoxia, and non-traumatic lesions are typically localized in the critical area (about 3 cm proximal to the calcaneal insertion), which receives less blood flow. When progressing, the degenerative process may initially result in partial rupture and subsequently in complete rupture of the tendon. Subcutaneous rupture of the Achilles tendon generally affects the

medium-proximal portion. However, in cases where the degenerative disease affects the distal third, it is frequently associated with deep retrocalcaneal bursitis.

Complete Achilles tendon rupture is relatively rare but is an injury of considerable clinical relevance. We report this case as it confirms that multiple corticosteroid injection treatments may be an important factor contributing to the rupture of the Achilles Tendon.

CONCLUSION

This case report describes a patient with a chronic total rupture of the left Achilles Tendon resulting from Haglund's deformity of the calcaneus and other contributing factors, including repeated corticosteroid injections.

The use of corticosteroids in Achilles tendinopathy is still controversial. Corticosteroids negatively affect healing by suppressing the inflammatory response, tenocyte proliferation and collagen synthesis. They can cause spontaneous rupture by reducing the tensile strength of the healing tendon. According to some studies, corticosteroids delay tendon healing, cause degeneration, and impair biomechanical properties. However, there are also publications reporting no side effects on the tendon and no increase in the rate of Achilles tendon rupture. There is no clear consensus on the benefits and damages.

The deformity was responsible for the degenerative process and injury to the surrounding tissues. FHL tendon transfer and surgical resection of Haglund's deformity and the osteophyte were used to resolve the rupture. Chronic Achilles tendon rupture is more difficult to manage than acute Achilles tendon rupture because it is associated with scar tissue formation at the tendon's gap, causing ankle dysfunction. FHL tendon transfer improved the patient's clinical condition, as evidenced by functional improvement (improved movement), anatomical improvement (improvement of the difference in leg shape), and pain amelioration.

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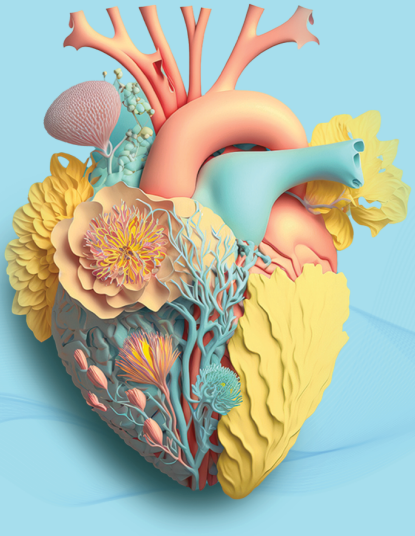

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