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HealthNews DIGEST

SEPTEMBER 2023

Dr. Sherbaz Bichu

CEO & Specialist Anaesthetist
Aster Hospitals & Clinics, UAE

On behalf of Aster's leadership, I am excited to welcome you to the 13th edition of the HealthNews Digest. What started as a novel initiative a year ago has become an indispensable medium through which we uphold our firm commitment to clinical superiority and knowledge dissemination. The enthusiasm and contributions from our doctor fraternities have only grown since the launch, and the newsletter today offers a wide array of content, from innovative treatments of complex cases to articles on patient-centric care.

I express my deep sense of gratitude towards everyone who has contributed in the first year and am confident that the outstanding teams of Aster doctors and our external clinical partners will continue to ardently support the initiative by sharing their expertise both in terms of ensuring clinical distinction and the best possible patient care.

Dr. Ramanathan V

Medical Director
Aster Hospitals & Clinics, UAE

As the Medical Director for Aster Hospitals and Clinics, it gives me immense joy to witness this initiative built on the core idea of shared clinical best practices completing one successful year and continuing to touch newer avenues with each successive edition. I applaud the efforts of all those who have worked hard at making this newsletter a core part of Aster ecosystem.

With an eclectic mix of cases and articles, this newsletter has given our doctor fraternities and allied professionals several groundbreaking ideas to collaborate on clinical best practices. I encourage everyone to keep up the extraordinary accomplishments in the medical science field and further augment contributions to the upcoming releases of HealthNews Digest.

Dr. Danu Chandradas
Obstetrics & Gynaecology (Specialist)

Dr. Yogeeswari Vellore Satyanarayanan
Cardiology (Specialist)

Pregnancy complicated by Cardiac Disease

High Risk Pregnancy complicated by Complex Heart Disease handled successfully at Aster Hospital, Sharjah

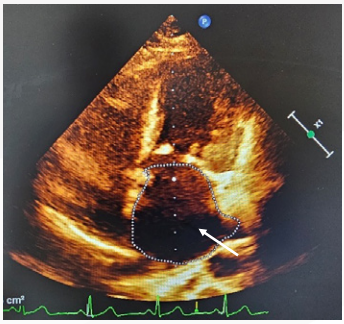
PRESENTATION

- 31-year-old G3P2L2 presented to Obstetrics and Gynaecology OPD at 12 weeks gestation with:
  - Essential hypertension (on medications)
  - Rheumatic Heart Disease
  - Anaemia
  - Previous 2 LSCS
  - Rh negative state complicating her current pregnancy
- Unplanned pregnancy diagnosed when she sustained a head injury following a road traffic accident. Diagnosed simultaneously with Rheumatic Valvular Heart Disease with moderate to severe Mitral Stenosis (MS), moderate Mitral Regurgitation (MR), and dilated Left Atrial (LA).
- Had consulted different doctors due to the high risk of maternal morbidity and mortality due to the associated cardiac disease severity. Some doctors had even advised her on Medical Termination of Pregnancy (MTP). She chose Aster Hospital, Sharjah, for a second opinion as she wanted to continue her pregnancy.
- Cardio–Obstetric–Fetal Medicine multidisciplinary team was formed to handle this patient.

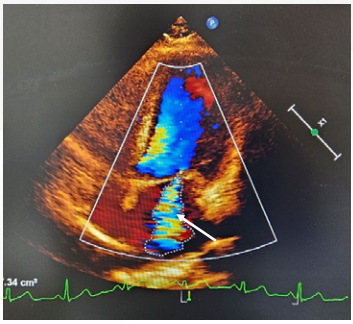
DIAGNOSIS & RISK ASSESSMENT

- A detailed baseline echo revealed moderate to severe mitral stenosis with moderate mitral regurgitation and dilated LA.
- Rh-Negative Pregnancy complicated by Rheumatic Mixed Mitral Valvular Heart Disease.
- Risk of acute heart failure/pulmonary oedema (20%), arrhythmias (5%), stroke (1-5%), and death (very rare) was explained to the patient and her husband (more common in the second trimester and around delivery time).

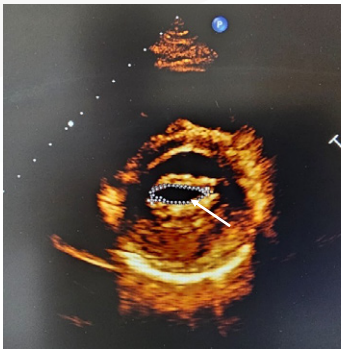
Transthoracic Echo Images



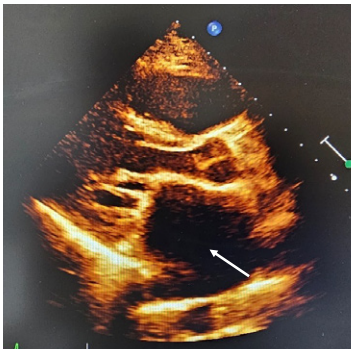
Dilated LA



Moderate MR



Mitral Valve Area (MVA) – 1.3 cm^2



Dilated LA

ANTENATAL PERIOD

- She was recommended for Foetal Anomaly Screening – given that she was on ACE inhibitors while she conceived.
- She was advised to follow up once in 2 weeks uptil 30 weeks GA and once weekly after that until delivery. Her cardiac and antihypertensive medications were optimized to keep the resting HR around 80-90/min to support her pregnancy state (the usual recommendation otherwise is to maintain a resting HR of 60/min to reduce the risk of Atrial Arrhythmias).
- Patient had shortness of breath, palpitation and effort intolerance, and pedal oedema during her 2nd and 3rd trimesters. These complaints could be very confusing as they could indicate early heart failure, and if not intervened, she could land up with pulmonary oedema. Her medications were optimized as needed, and a smart device was used to monitor her arrhythmias.
- Her foetal growth was closely monitored. She was planned for Elective LSCS (because of previous LSCS) with sterilization under general anaesthesia **(with expert management from Dr. Karthik Nallu, Specialist Anaesthesiologist)**, with close haemodynamic monitoring at 38 weeks, which was uneventful.

POST LSCS:

The patient was observed in the ICU post-operatively, where her cardiac status was well maintained. She was discharged after 48 hours of surgery and was monitored for 6 weeks post-delivery as haemodynamic changes may not return to normal until then.

DISCUSSION

Stenotic valve lesions are generally less tolerated during pregnancy than regurgitant lesions. Women with mitral stenosis, even mild mitral stenosis, are at risk for pregnancy-related complications. Those with mitral valve area <2cm^2 are associated with a high risk of adverse maternal cardiac events in pregnancy (1,2).

In women with moderate to severe mitral stenosis, the increased cardiac output and heart rate (decreased diastolic filling time) associated with pregnancy can increase left atrial pressure leading to complications, including atrial fibrillation and pulmonary oedema (3,4,5).

Rates of pulmonary oedema and new or recurrent arrhythmias are 37% and 16% for women with severe mitral stenosis and 18% and 5% for women with moderate mitral stenosis (6). Maternal mortality for women with severe mitral stenosis is 3%, and for women with moderate mitral stenosis, it is 1%.

Risk stratification for mixed and multivalve disease is compromised by lack of data but is determined by the predominant lesion.

CONCLUSION

Women with moderate- or high-risk Valvular Heart Disease (VHD) should be followed at a centre with obstetricians dealing with high-risk pregnancy, cardiologists, and obstetric anaesthesiologists with experience in VHD and pregnancy. Such high-risk pregnancies can be safely handled through close and meticulous monitoring, enabling timely intervention even before complication strikes.

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Benign Breast Diseases

Approaches for Diagnosis and Management of Benign Breast Diseases

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PRESENTATION

Benign breast disease (BBD) is a common condition that affects women and can cause symptoms such as breast pain, nipple discharge, breast heaviness, or the presence of a lump (1). Despite being highly prevalent, benign breast lesions are often overlooked, even though they account for up to 90% of breast-related clinical presentations (1). Until recently, accurately determining the nature of breast tumors often necessitated excision and histological examination due to the uncertainty associated with relying solely on preoperative physical assessment (2). However, the 'triple test," which combines physical examination, mammography, and FNAC (fine-needle aspiration cytology) or core biopsy has emerged as the gold standard for assessing breast lumps (2). Treatment for benign breast diseases varies based on severity and can include monitoring, medication, lifestyle changes, or surgery (2).

This article aims to describe different benign breast conditions, their diagnosis, and treatment approaches.

TYPES OF BENIGN BREAST DISEASE AND ITS TREATMENT:

BDD represents a complex number of diseases, which have a variable impact on the lives of patients (1). They constitute several types of lesions such as epithelial lesions, inflammatory lesions, fibrocystic changes, stromal lesions, and neoplasms (1).

ATYPICAL HYPERPLASIA

Atypical hyperplasia of the breast refers to the abnormal growth of epithelial cells that do not meet the criteria for classifying it as in situ carcinoma (3). Although imaging methods cannot identify atypical hyperplasia, it is detected through histopathologic analysis of biopsies and is considered as a precancerous lesion (3). Surgical excision is recommended for patients with atypical ductal hyperplasia (ADH) detected on core biopsies, but the management of atypical lobular hyperplasia (ALH) in small biopsies is a more controversial topic (3).

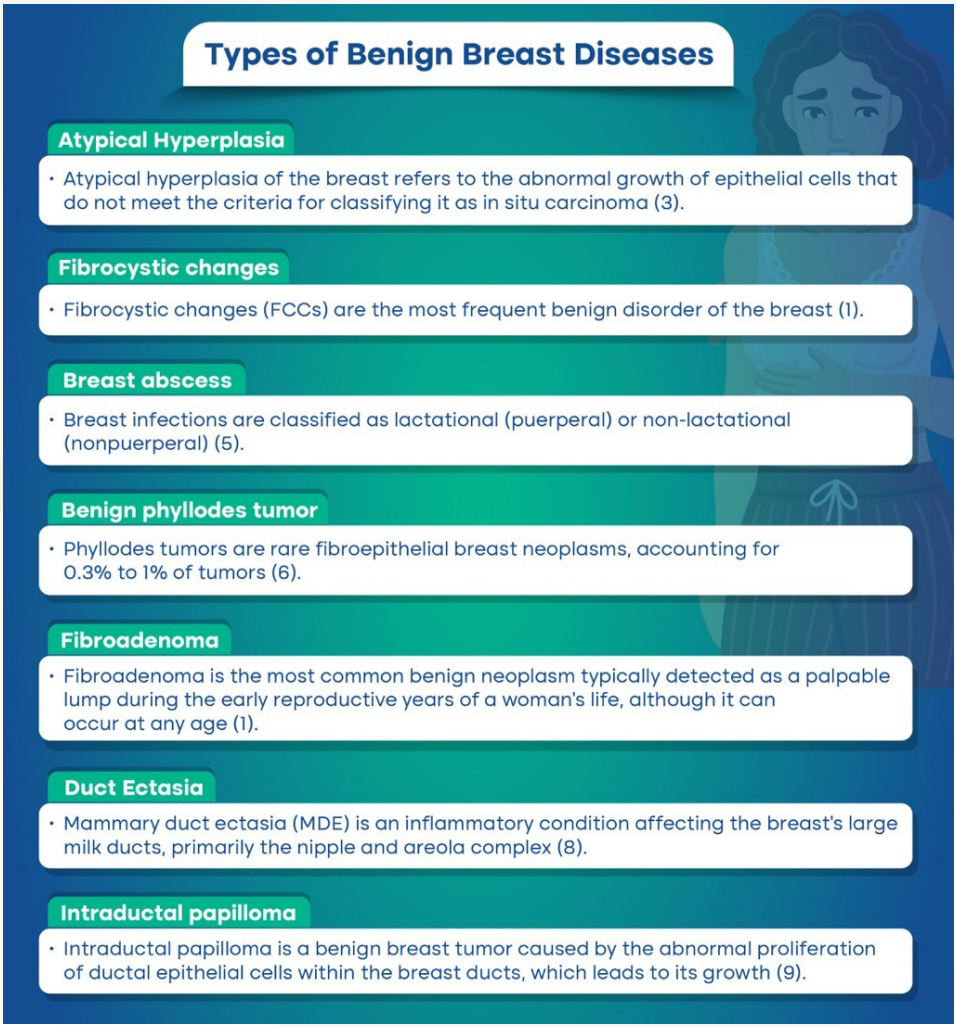

Figure 1: Different types of benign breast conditions.

FIBROCYSTIC CHANGES

Fibrocystic changes (FCCs) are the most frequent benign disorder of the breast (1). These changes affect premenopausal women between 20 and 50 years of age (1). Diagnosis typically involves mammography and ultrasonography (2). Treatment options may include breast support, non-steroidal anti-inflammatory drugs, supplements like evening prime rose oil and vitamin E, Hormone therapy which help reduce excessive cell proliferation caused by associated hormones (4).

BREAST ABSCESS

Breast infections are classified as lactational (puerperal) or non-lactational (nonpuerperal) (5). These infections may be associated with superficial skin issues or more serious underlying conditions (5). Physical examination is crucial for diagnosing the patient (5). In certain cases, needle aspiration is conducted to confirm the presence of a breast abscess, and the fluid obtained is subsequently analyzed (5). Treatment typically involves Ultrasound guided aspiration, Incision, and drainage, with antibiotics given before or after drainage (5).

BENIGN PHYLLODES TUMOR

Phyllodes tumors are rare fibroepithelial breast neoplasms, accounting for 0.3% to 1% of tumors (6). They can be benign, borderline, or malignant based on various histologic factors (6). Phyllodes tumors have the potential to recur and metastasize, with the risk varying depending on the histologic grade (6). Diagnosis primarily relies on histopathological examination. Treatment involves wide local excision with margins >1 cm, while mastectomy may be required for larger tumors (6).

FIBROADENOMA

Fibroadenoma is the most common benign neoplasm typically detected as a palpable lump during the early reproductive years of a woman's life but can occur at any age (1). Confirming the diagnosis typically involves ultrasound examination, and fine-needle aspiration (FNA) cytology or core biopsy (1). Surgical excision and cryotherapy are effective treatment options for fibroadenoma (2,7). Medical management with metformin which has anti-estrogenic and anti-proliferative properties is currently under study (7).

DUCT ECTASIA

Mammary duct ectasia (MDE) is an inflammatory condition affecting the breast's large milk ducts, primarily the nipple and areola complex (8). It is characterized by non-proliferative changes that presents nipple discharge or a palpable mass (8). Diagnostic imaging methods for MDE include mammography, ultrasound, CT, and MRI, and additional techniques like galactograms or duct endoscopy may be used. The treatment aims to alleviate symptoms and exclude more serious underlying conditions (8). Antibiotics, Anti-inflammatory drugs, and warm compresses are advised. In Intractable cases, surgical removal of the affected duct or total duct excision (Hadfield's operation) is indicated.

INTRADUCTAL PAPILLOMA

Intraductal papilloma is a benign breast tumor caused by the abnormal proliferation of ductal epithelial cells within the breast ducts, which leads to its growth (9). Diagnosis involves tests like clinical examination, mammography, ultrasound, biopsy, or aspiration (9). Surgical removal is the preferred treatment to prevent progression to atypical ductal hyperplasia or atypical ductal hyperplasia or ductal carcinoma in situ (DCIS) (9).

DIAGNOSING BENIGN BREAST DISEASE WITH TRIPLE TEST ASSESSMENT:

A triple assessment for a breast lump is considered the gold standard in diagnosing all palpable breasts, which includes clinical examination, imaging (mammography, ultrasonography), and percutaneous biopsy (either core biopsy or fine needle aspiration) (1).

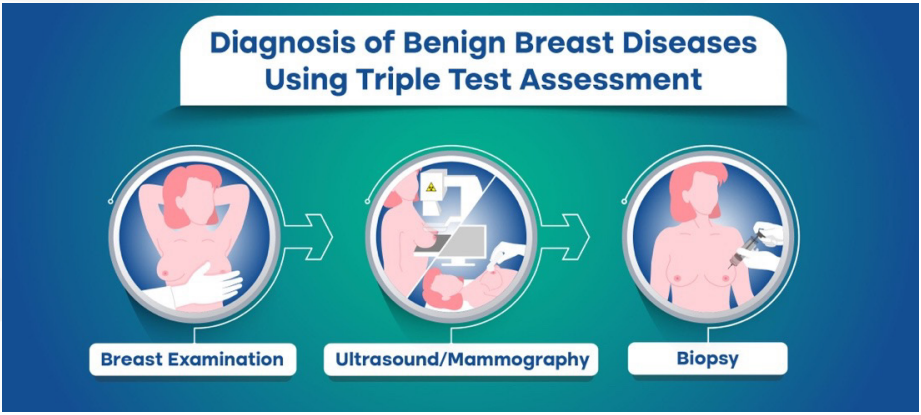

Figure 2: Steps of Triple Test Assessment

CLINICAL BREAST EXAMINATION

A clinical breast exam plays a pivotal role in the diagnosis and surveillance of many benign and malignant breast diseases (2). The primary objective of conducting a clinical breast examination is to detect a palpable dominant mass (2). It is crucial to establish a definitive diagnosis for a palpable dominant breast mass promptly (2).

MAMMOGRAPHY AND ULTRASONOGRAPHY

An annual screening mammogram can identify abnormalities that may not be clinically evident (2). Common abnormal findings on mammograms include calcifications, masses densities, asymmetry, and architectural distortion (2). Radiologists and Surgeons follow the guidelines of the Breast Imaging Reporting and Data System (BI-RADS) to understand and treat mammographic findings (2). Mammography with ultrasound is utilized for evaluating palpable lesions in women over 35, while ultrasound can be an alternative for younger women (2).

FINE NEEDLE ASPIRATION AND CORE BIOPSY

Fine needle aspiration (FNA) is a frequently used technique for evaluating palpable breast masses, breast cysts, and nonpalpable abnormalities detected on mammograms (7). It utilizes a small needle (21 to 25 gauge) to obtain tissue and fluid samples from solid or cystic breast lesions. Core biopsy under imaging guidance, serves as a diagnostic modality for assessing breast masses without the need for formal excision (7).

TREATMENT OF BENIGN BREAST DISEASES:

The treatment of BDD depends on the specific type and severity of the disease (1). While active treatment may not always be necessary, regular monitoring and observation are common management approaches (2). Medication, lifestyle changes, or surgical procedures may be utilized in certain cases (2).

LUMPECTOMY

A lumpectomy, also known as a partial mastectomy, is a surgical intervention used to treat benign breast disease (11). Lumpectomy involves careful excision of the tumor and a surrounding area of healthy breast tissue (11). The primary goal is to eradicate any cancer cells by ensuring a narrow border of unaffected tissue surrounding the tumor (11).

ENDOSCOPY-ASSISTED BREAST SURGERY

Endoscopy-assisted breast surgery (EABS) is a minimally invasive approach carried out through small incisions in the axillary and/or periareolar regions but is now used to excise tumors, resect malignant breast tumors, and assist in sentinel lymph node biopsy (11). EABS has emerged as a potential alternative surgical method for managing benign breast tumors, offering the advantage of improved cosmetic results as it is performed through discrete incisions concealed in inconspicuous areas (11).

CRYOTHERAPY

Cryotherapy is an FDA-approved non-surgical treatment for fibroadenomas, eliminating the need for resection (7). The cryotherapy procedure involves administering local anesthesia and percutaneous insertion of a cryoprobe through the fibroadenoma (7). Cryotherapy disrupts cellular membranes, leading to thrombosis and reduced oxygen supply, resulting in fibroadenoma tissue hyalinization and gradual resorption (11). Histological examination confirms these changes (11). Benefits include pain relief, ultrasound visualization, no mammographic changes, and potential immunostimulatory effects (11).

ADVANCES IN TREATING BENIGN BREAST DISEASE

- Less invasive techniques are emerging for managing benign breast diseases, eliminating cell clusters without surgery (12).
- Cryoablation, radiofrequency ablation, microwave ablation, high-intensity focused ultrasound (US), laser therapy, vacuum-assisted excision, and irreversible electroporation are among the emerging techniques for the management of benign breast diseases (12).
- Ongoing clinical trials are currently underway to gather additional data before incorporating these advancements into a validated treatment algorithm. (12). Further research is needed to determine their efficacy and establish their role in clinical practice (12).

Key Highlights

- Benign breast disease represents complex numbers of disorders, which can cause a significant impact on patient's lives (1).
- The combination of physical examination, mammography, and FNAC, known as the "triple test," has become the gold standard for assessing breast lumps (1).
- Treatment for benign breast diseases varies based on severity, with monitoring, medication, lifestyle changes, or surgery as possible options (1).

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Achilles Tendon Repair

Salvage Flexor Hallucis Longus (FHL) Tendon Transfer for a Failed Achilles Tendon Repair done successfully at Aster Cedars Hospital & Clinic, Jebel Ali

Dr. Shafeed Thadathil Parambil
Orthopaedics (Specialist)

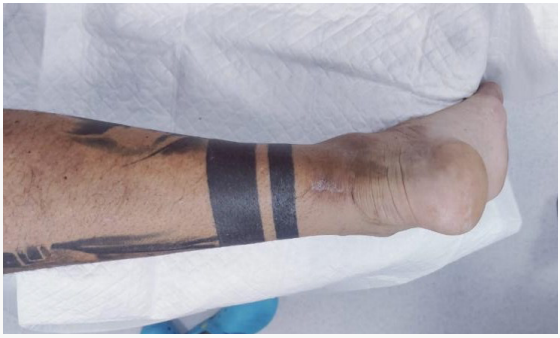
PRESENTATION

- 41 year old male
- Chronic smoker
- Difficulty in walking following twisting injury of left ankle
- Medical history of surgery 2 months back for closed rupture of Tendon Achilles on the same side

FINDINGS

During Examination:

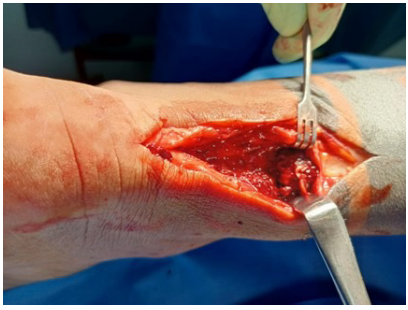
- A linear surgical scar over the posterior aspect of the left ankle; 5 cm in length, which healed by primary intention
- Achilles tendon was not palpable distally
- Thompson test was positive
- MRI scanning showed thinned out distal part of the Achilles Tendon with a gap of more than 10 cm between the torn ends



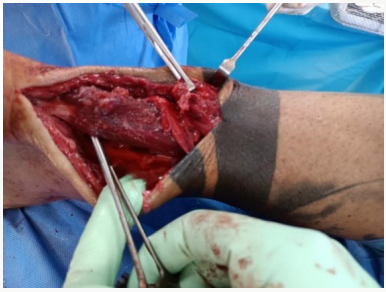
Clinical image at the time of presentation

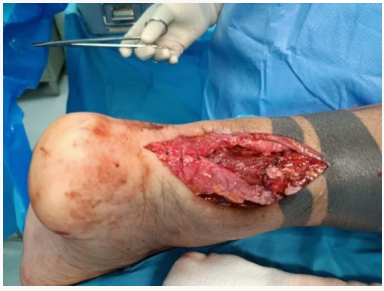
DURING PROCEDURE

- The procedure was done under spinal anaesthesia.
- Prone position. The left leg was prepared and draped after applying a tourniquet.
- Midline skin incision was made through a previous surgical scar.
- The sural nerve was dissected out and retracted laterally.
- The paratenon was incised, the proximal part of the Achilles tendon was mobilized, and the distal part was found to be thinned out and short.
- Fascia over the medial side was incised, flexor halluces longus tendon was identified, dissected, and divided close to Henry's knot.
- The distal end of the tendon was prepared using fiber wire with a graft diameter of 6 mm.
- A 6 mm tunnel was made in the calcaneum at the site of the Achilles Tendon insertion.
- The FHL graft was pulled through the tunnel and fixed with a 7 mm bio screw holding the foot slightly plantar flexed.
- Proximal part of the Achilles tendon was sutured to the FHL belly using 2-0 Vicryl.
- Wound was closed in layers after attaining haemostasis, and the above-knee slab was applied in a functional position.

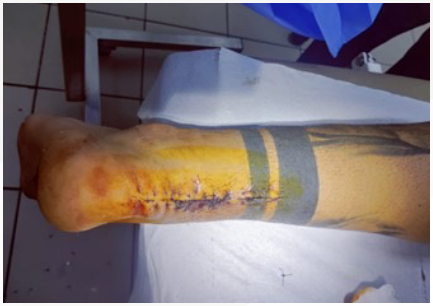


Intraoperative image showing the gap between the torn ends of Achilles Tendon





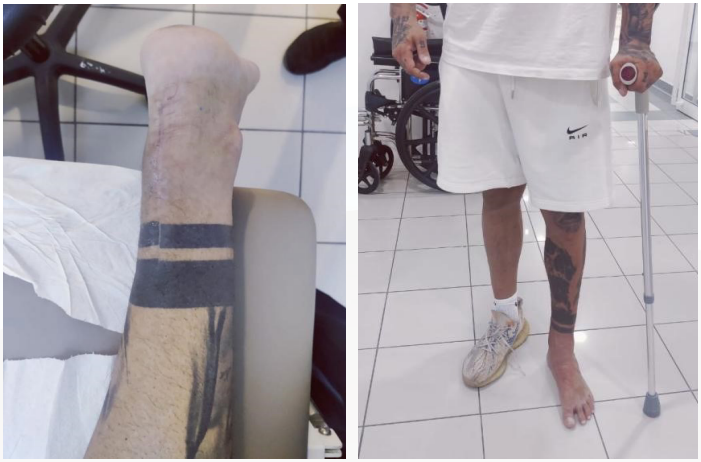
Proximal end of Achilles Tendon sutured to transferred FHL Tendon



Closure of Paratenon and Skin

POST PROCEDURE

- The patient was discharged on 2nd postoperative day.
- Above-knee cast was applied in the plantar flexion of the foot for 6 weeks, and after that below-knee cast was in the neutral position of the foot for 6 weeks.
- Non-weightbearing was advised for 3 months.
- Mobilization of the knee was started 6 weeks after the surgery and 3 months later for the ankle.
- Partial weight-bearing with support was started 3 months after the surgery, and full weight-bearing without support started 4 months later.



Postoperative image showing well-healed wound and patient walking with support

DISCUSSION

Despite being the strongest tendon in the body, the Achilles Tendon is vulnerable to spontaneous rupture due to overload and local pathology. The difficulties in managing neglected ruptures make it one of the challenging problems of present-day orthopaedic practice. Treatment of neglected ruptures ranges from conservative management, percutaneous suture, and open surgical repair to tendon transfers.

FHL is favoured over peroneus brevis in gap reconstructions since FHL, by virtue of its anatomical and technical advantages, offers the best replacement for neglected ruptures of the Achilles Tendon. FHL transfer can overcome many problems associated with the surgical technique and postoperative complications and stands as the procedure of choice.

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Pulmonary Hypertension

Current Scenarios in the Diagnosis and Treatment of Pulmonary Hypertension

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Pulmonary Hypertension (PH) is a clinical syndrome characterized by elevated blood pressure in the pulmonary arteries - the blood vessels leading from the heart to the lungs (1). PH is a relentlessly progressive disease with high morbidity and mortality. In PH, the mean pulmonary artery pressure (mPAP) at rest goes above 20 mm Hg and is characterized by an increase in pulmonary vascular resistance, which leads to right ventricular failure and premature death (2,3). PH affects approximately 1% of the global population, up to 10% of individuals older than 65 years, and at least 50% of patients with heart failure (4).

PH is not a single disease - rather it is the end result of a variety of different diseases wherein the elevation of pressure in the pulmonary vascular bed is the common denominator. It is highly heterogeneous and challenging to diagnose and treat and has poor survival outcomes (5). To aid early diagnosis and effective management, this article presents an overview of the diagnostic techniques and treatment approaches for PH.

CLINICAL CLASSIFICATION AND SYMPTOMS OF PH

World Health Organization (WHO) classification has categorized PH into five groups based on pathophysiology, hemodynamic characteristics, clinical features, and management strategies as follows (6,7):

- Group 1 - PH due to an intrinsic abnormality in the pulmonary arterial bed (from genetic or hereditary abnormalities, drugs, toxins, connective tissue diseases, etc.)
- Group 2 - PH associated with left heart disease.
- Group 3 - PH associated with lung diseases and/or hypoxia.
- Group 4 - PH associated with pulmonary artery obstruction.
- Group 5 - PH with unclear and/or multifactorial mechanisms.

It is important to recognize that the term 'pulmonary arterial hypertension (PAH)" is specifically reserved for patients in the Group 1 PH while the term 'pulmonary hypertension" is applied to any patient with elevated pressure in the pulmonary vasculature, including those in the Group 1 PH.

The symptoms of PH are initially non-specific. Exertional dyspnea and fatigue are the most common initial symptoms; some patients may present with chest pain, light-headedness, syncope, or cough. As PH progresses, signs and symptoms of RV failure develop and present as edema, ascites, and abdominal distension (8). Haemoptysis, Ortner's syndrome/hoarseness, and arrhythmias rarely occur in some cases (8). The severity of symptoms is used to assess the degree of functional limitation from PH using the New York Heart Association (NHYA) functional classification (Classes 1 to 4).

Patients with severe PAH or right heart failure die sooner without treatment (usually within one year) than patients with mild PAH or no right heart failure. Other factors associated with poor outcomes include male gender, age over 50 years, more advanced WHO functional class (III or IV), evidence of RV dysfunction on echocardiography, elevated NT-proBNP, hypocapnia on oximetry, prolonged QRS duration, persistent atrial fibrillation or atrial flutter, comorbid conditions (COPD, diabetes, connective tissue disease), PH associated with selective serotonin reuptake inhibitors, reduced von Willebrand factor levels and bone morphogenetic protein receptor type 2 (BMPR2) mutations (9-11).

DIAGNOSTIC TOOLS FOR IDENTIFICATION OF PH

The diagnosis of PH is often delayed because the symptoms are frequently attributed incorrectly to age, deconditioning, or a coexisting or alternate medical condition. With a sufficient index of suspicion, the diagnosis of PH can be made clinically using a constellation of clinical findings and noninvasive testing (12). The commonly used techniques and the indications suggestive of PH are detailed in the figure below (Figure 1).

While abnormalities on ECG and/or chest X-ray may raise suspicion about the existence of possible PH, the findings are often absent and non-specific. Transthoracic echocardiography is the initial testing modality of choice for any patient with suspected PH. Ventilation-perfusion lung scan or pulmonary angiography are occasionally required, especially if Group 4 PH is suspected. Additional tests that may be appropriate include laboratory tests (eg, autoimmune serologies, viral serology, and liver and thyroid function tests), overnight oximetry, testing for sleep apnea, and cardiopulmonary exercise testing, stool, and urine parasite testing, coagulation profile tests.For patients with PH on echocardiography who have insufficient left heart disease, chronic lung disease, hypoxia, or pulmonary artery obstructions, additional investigations targeted at other suspected etiologies may be necessary. The sequence and extent of investigations vary.

The gold standard test to confirm PH is right heart catheterization (RHC) which should be strongly considered for all patients with PH and is mandatory when selecting more tailored therapies for PH. RHC also helps to estimate the severity of PH (mild, moderate, or severe based on mPAP 20 - 29, 30-34, or ≥35 mm Hg respectively). It can also be used to characterize the hemodynamic profile of the PH patient (normal versus elevated pulmonary capillary wedge pressure), calculate the pulmonary vascular resistance, and determine the reactivity to vasodilator therapy in select patients. These later parameters have an important role in adopting various treatment strategies and subsequent follow-up of individual PH patients. RHC for PH should be performed only at centers specialized in the care of PH patients.

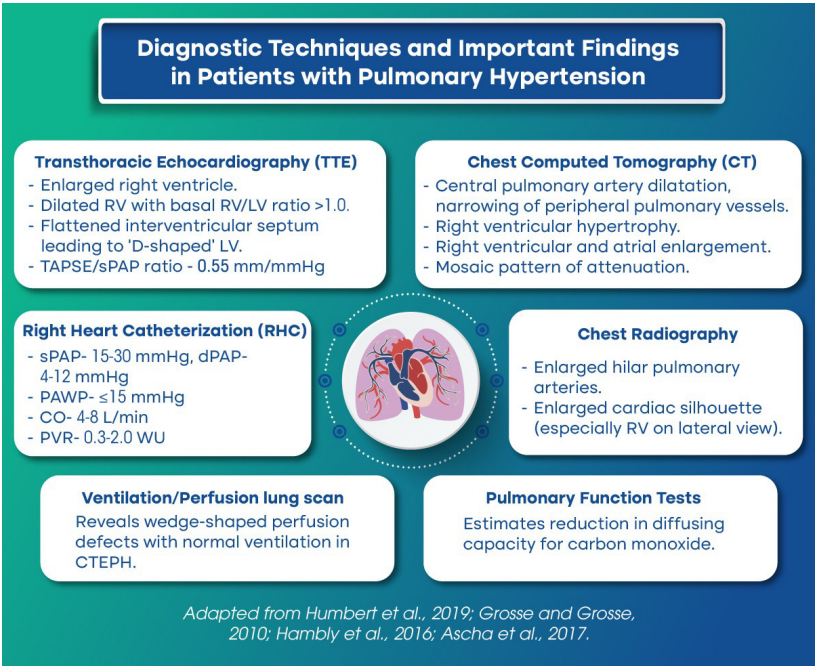

Figure 1: Diagnostic techniques for the detection of PH (13-16).

Abbreviations: RV- right ventricle; LV- Left ventricle; TAPSE: tricuspid annular plane systolic excursion; sPAP- systolic pulmonary artery pressure; dPAP- diastolic pulmonary artery pressure; PAWP- pulmonary arterial wedge pressure; CO-cardiac output; PVR- pulmonary vascular resistance; WU- Wood units; CTEPH- chronic thromboembolic pulmonary hypertension.

TREATMENT APPROACHES FOR PH

There's no cure for pulmonary hypertension. The available treatments aim to improve clinical class and slow the progress of the disease and it often takes some time to find the most appropriate treatment for PH. The treatments are often complex and multifaceted and require extensive follow-up care. The treatment approach for PH is involves 3 major aspects of therapy: general (supportive) measures, treatment of the underlying disorder(s), and management of co-morbidities and complications (12). Some of these approaches include:

- Oxygen therapy: Indicated when hypoxemia manifests with arterial pO2 <60 mm Hg.
- Correction of any anemia or iron deficiency.
- Administration of diuretics (in patients with signs of hyperhydration).
- Anticoagulants (for chronic thromboembolic pulmonary hypertension/ comorbidities).
- Certain rehabilitation measures and active physiotherapy help to improve exercise capacity, quality of life, and cardiac function.

Beyond these general measures, it is essential to classify PH correctly to ensure the adoption of specific treatments appropriate for the type of PH (4). There is a significant phenotypic and genotypic overlap in the different WHO groups and successful treatment requires a more 'precise" definition of what is being treated. This clarity in approach is especially important in

the context of specific PH-targeted therapies that have been developed during the last several years. The currently available targeted therapies affect separate pathophysiologic arms involved in PH and include prostacyclin analogs or receptor agonists (Epoprostenol, Treprostinil, Iloprost, Selexipag), phosphodiesterase type 5 inhibitors (Sildenafil, Tadalafil, Vardenafil), soluble cyclic GMP agonists (Riociguat) and endothelin receptor antagonists (Ambrisentan, Bosentan, Macitentan). Agents from these classes of medication have been shown to improve exercise capacity, hemodynamics, and outcomes in patients with PH. However, such targeted therapies are mainly used in Group 1 PH (i.e., PAH) and in select types/cases of other PH groups and should not be used in cases of Group 2 or 3 PH patients. Inappropriate adoption of these established therapies may be ineffective or even harmful (18, 19). It is recommended that the PH-targeted therapies should be started after right heart catheterization in specialized centers by providers experienced in treating PAH. Furthermore, effective therapy should be instituted in the early stages before irreversible changes in the pulmonary vasculature. Therefore, early diagnosis and referral to PH centers are essential for improving patient outcomes (18, 19). The important treatment options for different groups of PH are listed below (Table 1).

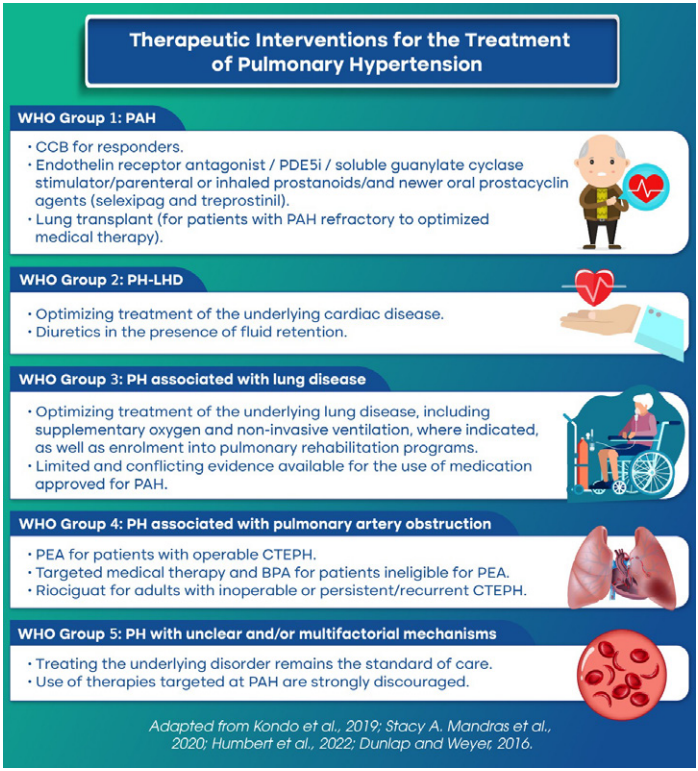

Table 1: Treatment of PH for various PH subgroups (2,4,13,17).

Abbreviations: CCB- Calcium channel blockers; PDE5i- Phosphodiesterase 5 inhibitor; PAH- Pulmonary arterial hypertension; PEA- Pulmonary endarterectomy; BPA- balloon pulmonary angioplasty; CTEPH- chronic thromboembolic pulmonary hypertension.

Finally, certain aspects of PH need special mention. The natural history of PH patients can be punctuated by intermittent development of acute deterioration (PH crisis) - a potentially fatal complication manifested by a rapid rise in pulmonary vascular resistance leading to acute right heart failure, inadequate cardiac output, and shock. Triggers include surgery, anesthesia, acute lung disease, fever, hypovolemia, or interruption of targeted PH therapies. Management includes administration of oxygen, intravenous prostanoids, and prompt referral to a specialized PH center (20). Another important consideration in female PH patients is pregnancy because it is associated with high maternal and fetal risk and is generally contraindicated. Worsening pulmonary vascular hemodynamics and progressive PH during pregnancy lead to increasing dyspnea and hypoxemia, and acute cardiovascular collapse and death can occur in the first 24 to 36 hours after delivery. Fetal hypoxemia, growth restriction, congenital anomalies including teratogenicity, and fetal death can also occur. PH-specific therapy should be continued during pregnancy if indicated with careful adjustments in the medication class and/or dosing. Assisted vaginal delivery is preferred, provided there are no other indications for cesarean section. Breastfeeding should be discouraged and counseling regarding contraception should be necessarily provided. Surgical sterilization runs the risk of precipitating an acute PH crisis (21).

Key Highlights

- Pulmonary hypertension (PH) features progressive loss and obstruction of the pulmonary vascular bed, leading to elevated mPAP and PVR, which can ultimately produce RV dysfunction and RV failure (4).
- Early and accurate diagnosis depends upon clinical suspicion in patients at high risk and those with unexplained symptoms such as dyspnea, edema and syncope (9).
- Transthoracic echocardiography (TTE) remains the most important non-invasive screening tool and right heart catheterization (RHC) remains mandatory to establish the diagnosis of PH (7).
- Targeted treatments are licensed for patients with PAH whereas surgical pulmonary endarterectomy is the treatment of choice for eligible patients with CTEPH (4).

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Infectious Mononucleosis Induced Jaundice

A Rare Case of Infectious Mononucleosis Induced Jaundice Complicated by Possible Drug Induced Liver Injury (DILI) treated successfully at Aster Hospital, Mankhool

PRESENTATION

- 29 year old female
- Fever, sore throat, headache, fatigue for 1 week
- Epigastric pain, nausea, darkening of the urine for 2 days
- Past medical history of PCOD and insulin resistance, on Glucophage and GLP-1 receptor agonists
- Received Injections Ceftriaxone and Medivitan, Paracetamol and discharged on Amoxyclav, Maxigesic and Fludrex from another hospital 3 days ago
- Received Doxycycline for treatment of acne 2 weeks prior to illness, for 1 week
- No h/o smoking or alcohol consumption
- No past surgical history
- No family history of medical illness

FINDINGS

On examination:

- Febrile, persistent high fever
- Mild scleral icterus
- Enlarged posterior cervical lymph nodes, tender and extremely painful

On investigations:

- CBC showed low haemoglobin and hematocrit and high basophil & lymphocyte counts.
- High CRP (43.7mg/dL; normal <5mg/dL).

- LFTs revealed high direct bilirubin (5 mg/dl; normal 0.1-1.2), increase in liver enzymes SGOT (178; normal <35) and SGPT (199; normal <33), and increase in Alkaline phosphatase (398; normal 35-104).
- An abdominal ultrasound revealed hepatosplenomegaly with mild pericholecystic oedema. A mildly bulky head of the pancreas was noted, with no prominent peri-pancreatic fluid collection.
- A hepatitis panel was done, which came negative.
- Autoimmune etiologies were ruled out by negative antibody testing (Liver Kidney Microsomal (LMK) antibody, Anti-nuclear antibody (ANA), Anti-smooth muscle antibody (ASMA), Serum immunoglobulin IgG, Anti-soluble liver antigen).
- Mono spot test came out positive and a neck ultrasound confirmed cervical lymphadenopathy.
- MRCP was done to rule out any hepatobiliary disorders that revealed hepatosplenomegaly with oedema of the gallbladder wall; however, no choledocholithiasis was noted. The pancreas showed a normal homogenous texture, and no peripancreatic inflammatory changes were seen.

	ADMISSION (DAY 0)	DAY 2	DAY 5
1. Total Bilirubin	5.01	6.54	5.36
a. Direct Bilirubin	3.33	6.21	5.06
b. Indirect Bilirubin	1.68	0.33	0.30
2. SGOT	178	220	285
3. SGPT	199	165	187
4. Alkaline Phosphatase	398	548	559

Serial Liver Function Tests during Admission

DIAGNOSIS

- Infectious Mononucleosis – Drug induced liver injury secondary to Doxycycline, Amoxyclav, Analgesics, Antipyretics.

COURSE IN HOSPITAL

- All potential hepatotoxic drugs were stopped.
- Ursofalk and N-acetylcysteine were started.
- Liver biopsy was advised, but the patient refused.
- As the patient continued to have a severe sore throat, lymphadenitis, fever and persistent jaundice with rising liver enzymes, steroids were started.

FOLLOW-UP

The patient started improving and was discharged home. On follow-up after 3 weeks from the time of admission, the patient recovered completely with normalisation of liver functions (SGOT 27 and SGPT 21). Subsequent tests done at 5 weeks and 8 weeks remained normal.

	FOLLOW-UP AFTER 4 DAYS	FOLLOW-UP AFTER 2 WEEKS	SUBSEQUENT FOLLOW-UP RESULTS	
1. Total Bilirubin	1.78	0.92	0.62	0.60
a. Direct Bilirubin	1.43	0.71	-	-
b. Indirect Bilirubin	0.35	0.21	-	-
2. SGOT	230	27	-	21
3. SGPT	245	21	12	13
4. Alkaline Phosphatase	441	157	-	50

Liver Function Tests on Follow-up

DISCUSSION

- Infectious mononucleosis may present with the following symptoms: fever, sore throat, headache, body ache, swollen lymph nodes in the neck and armpit with enlarged liver and spleen.
- Jaundice is a rare presentation.
- Normally, no specific treatment is required, and most immuno-competent patients make an uneventful recovery.
- Steroids are required in some patients for significant complications like impending upper airway obstruction, massive splenomegaly, or myocarditis.
- This patient was given steroids because she remained persistently symptomatic with worsening liver parameters.
- Interestingly, steroids also help treat severe drug-induced liver injury, which cannot be ruled out in this patient.
- Liver is the main point of metabolism of most drugs, making it susceptible to drug-induced injury (DILI). DILI can mimic all forms of acute and chronic liver diseases, which poses a significant challenge as seen in this case.
- In this case, the following drugs may be associated with DILI: Acetaminophen, Amox yclav, Doxycycline, and Ibuprofen.

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