The Review Of
DIABETIC
STUDIES OPEN ACCESS

# Meigs Syndrome: Clinical Features, Diagnostic Challenges, And Multidisciplinary Management In Nursing, Laboratory, Psychotherapy, And Family Medicine

**Moayad Musaddif Z Moafa[1], Haneen Ibraheem A Mathkoor[2], Banana Abdulraheem Alaqeel[3], Ashwaq Khormi[4], Hassan Mohammed Hassan Asiri[5], Ali Mohammed Mohammed Al Merbah[6], Meshal Mahdi Alshehri[7], Fahad Mesfer Alotaibi[8], Maher Abdullah Aljuhani[9], Khalid Saeed Oudah Alahmari[10], Basem Ahmed Nasser Shebayli[11], Mohammed Majbur Ali Awaji[12], Ahmed Mohammed Hussain Darbashi[13], Bishri Dhaifallah Awam Alhazmi[14]**

*[1]King Fahad Hospital, Ministry of Health*
*[2]Al Mowassam General Hospital*
*[3]Qaariah Primary Healthcare Center, Jazan*
*[4]Ministry of Health Branch, Jazan*
*[5]Muhayil General Hospital, Asir Region, Muhayil Asir*
*[6]Muhayil General Hospital*
*[7]King Khalid University Hospital*
*[8]King Khalid University Hospital*
*[9]King Abdulaziz University Hospital*
*[10]King Khalid University Hospital*
*[11]King Khalid University Hospital*
*[12]King Khalid University Hospital*
*[13]Samtah General Hospital, Jazan*
*[14]Primary Health Care Center, Al Huossenya*

**Abstract:**

**Background:** Meigs syndrome is a rare clinical entity defined by the triad of a benign ovarian tumor, ascites, and pleural effusion, with complete resolution after tumor removal. It frequently mimics ovarian malignancy due to similar clinical and radiological features.
**Aim:** This study aims to summarize the clinical presentation, diagnostic challenges, pathophysiology, and multidisciplinary management of Meigs syndrome, emphasizing strategies for accurate diagnosis and optimal patient outcomes.
**Methods:** A comprehensive review of clinical features, epidemiology, pathophysiology, histopathology, and management approaches was conducted based on available literature and case-based evidence outlined in the manuscript. The evaluation integrates history, examination, laboratory analysis, imaging, and fluid studies as described.
**Results:** Findings highlight that Meigs syndrome predominantly affects postmenopausal women and is most commonly associated with ovarian fibromas. Ascites and pleural effusions arise through mechanical lymphatic obstruction, peritoneal irritation, and increased vascular permeability mediated by VEGF. Diagnostic confusion with malignancy is common due to overlapping signs and elevated CA-125 levels. Definitive treatment through surgical excision results in rapid resolution of effusions and an excellent prognosis, while symptomatic management supports nonsurgical patients.
**Conclusion:** Early recognition and multidisciplinary coordination are essential to avoid misdiagnosis and unnecessary oncologic interventions. Surgical removal of the benign tumor ensures complete recovery, while supportive care enhances patient well-being.

**Keywords:** Meigs syndrome; ovarian fibroma; ascites; pleural effusion; CA-125; differential diagnosis; multidisciplinary management.

**Introduction:**

Meigs syndrome is a rare clinical entity defined by the triad of a benign ovarian tumor, ascites, and pleural effusion. It accounts for approximately 1% of ovarian tumors and often mimics malignant ovarian neoplasms due to overlapping clinical and radiologic features. Accurate recognition is critical to avoid unnecessary aggressive treatment and to provide appropriate multidisciplinary management. The syndrome was first described by Joe Vincent Meigs in 1937, who reported seven cases of patients presenting with ovarian fibromas accompanied by ascites and hydrothorax. Meigs uniquely observed that both ascites and pleural effusion resolved after surgical excision of the ovarian tumor, highlighting a benign postoperative course despite initially alarming presentations [1]. In 1954, Meigs established the diagnostic criteria for the syndrome. These include the presence of a benign ovarian tumor—commonly a fibroma, thecoma, granulosa cell tumor, or Brenner tumor—along with ascites and pleural effusion, which resolve following tumor removal [2]. Although pericardial effusion is not part of the classic definition, isolated case reports have documented its resolution after excision of a benign ovarian mass, suggesting potential systemic fluid responses associated with the syndrome [3]. Clinically, Meigs syndrome predominantly affects postmenopausal women. Patients often present with dyspnea, dry cough, and abdominal distension caused by ascites. Physical examination may reveal adnexal masses, decreased breath sounds in the lung bases, and fluid wave or shifting dullness indicative of ascites. In younger patients, the identification of Meigs syndrome should prompt evaluation for syndromic associations such as Gorlin syndrome, which may predispose to benign and malignant neoplasms. Diagnostic evaluation integrates history-taking, physical examination, laboratory studies, imaging, and fluid analysis. Imaging modalities such as ultrasound, CT, and MRI confirm the presence of a pelvic mass and aid in differentiating benign from malignant lesions. Laboratory investigations, including tumor markers like CA-125, are essential, although mild elevations may occur in benign cases and should not be interpreted as definitive evidence of malignancy. Analysis of ascitic and pleural fluids is necessary to exclude malignant cells and infections. Definitive diagnosis is established when ascites and pleural effusion resolve after surgical removal of the ovarian tumor [1][2][3].

Management of Meigs syndrome is primarily surgical. In women of reproductive age who wish to preserve fertility, unilateral salpingo-oophorectomy is recommended, removing only the affected ovary and fallopian tube. In postmenopausal women, total abdominal hysterectomy with bilateral salpingo-oophorectomy may be performed. For patients who are not surgical candidates or require symptomatic relief preoperatively, paracentesis and thoracentesis provide temporary management of ascites and pleural effusions. In selected cases, indwelling catheters may be placed to manage recurrent fluid accumulation. Multidisciplinary care involving gynecology, nursing, laboratory medicine, family medicine, and psychotherapists ensures comprehensive assessment, perioperative monitoring, and psychosocial support. Nursing teams monitor fluid status and provide post-surgical care, laboratory specialists confirm benign pathology and track biochemical parameters, family medicine physicians coordinate ongoing care, and psychotherapists address anxiety and stress related to the initial suspicion of malignancy and the surgical process. Effective recognition and treatment of Meigs syndrome prevent unnecessary oncologic interventions and improve patient outcomes. Understanding its clinical presentation, diagnostic approach, and multidisciplinary management is essential for healthcare providers across specialties involved in the care of patients presenting with adnexal masses, ascites, and pleural effusions [1][2][3].

**Etiology**

The exact etiology of the ascites and pleural effusions characteristic of Meigs syndrome remains unclear. These manifestations are most frequently associated with benign ovarian tumors, particularly fibromas, but the mechanisms leading to fluid accumulation have not been fully elucidated. Some evidence suggests that the tumor itself may induce local irritation of the peritoneum or mechanical obstruction of lymphatic channels, leading to fluid accumulation in the abdominal cavity. The subsequent development of pleural effusion is believed to result from the migration of peritoneal fluid through diaphragmatic defects or

lymphatic channels into the pleural space [4]. Atypical or incomplete forms of Meigs syndrome, in which pleural effusion occurs in the absence of ascites, indicate that fluid collections in these cavities can develop independently. This variability suggests that multiple factors may contribute, including tumor size, location, and interaction with surrounding tissues, rather than a single unifying pathological process. Additionally, these atypical presentations require careful differential diagnosis, as they may overlap with or mimic other conditions such as malignant ovarian tumors, liver disease, congestive heart failure, or infections that can also produce ascites or pleural effusions. Hormonal activity of ovarian tumors has been proposed as another possible contributing factor. Certain tumor types, such as thecomas and granulosa cell tumors, can produce estrogen, which may influence vascular permeability and fluid dynamics. Other molecular factors, including inflammatory cytokines and vascular growth mediators, may play roles in increasing capillary permeability and promoting fluid leakage into peritoneal or pleural spaces. Despite these hypotheses, no single etiological mechanism has been universally confirmed, and ongoing research aims to clarify the interplay between mechanical, vascular, and biochemical processes in the development of Meigs syndrome. Understanding the etiology is crucial for distinguishing benign from malignant processes and guiding appropriate surgical and medical management [4].

**Epidemiology**

Meigs syndrome is a rare condition, representing approximately 1% of ovarian tumors. Among these, the majority are benign fibromas confirmed on histopathological examination. Fibromas themselves constitute roughly 2% to 5% of all surgically excised ovarian tumors, making the syndrome an uncommon but clinically significant entity [5]. Ascites is present in approximately 10% to 15% of women with ovarian fibromas, while pleural effusions are observed in around 1% of cases, highlighting the infrequent nature of the full triad of Meigs syndrome [6]. The distribution of pleural effusions in Meigs syndrome shows a predominance for the right hemithorax, accounting for approximately 70% of cases. Left-sided effusions occur in about 15% of cases, and bilateral effusions are reported in the remaining 15% [7]. This right-sided predominance may be explained by anatomical variations, including diaphragmatic lymphatic pathways and potential pressure gradients between the peritoneal and pleural cavities. Age is an important epidemiological factor. Meigs syndrome is rarely diagnosed before the third decade of life. Its incidence increases with age and reaches a peak in the seventh decade, coinciding with the postmenopausal period when ovarian fibromas are most commonly identified [8]. Although the syndrome primarily affects older women, clinicians must remain vigilant in younger patients presenting with adnexal masses, ascites, and pleural effusion, as atypical presentations may indicate syndromic associations or rare tumor subtypes. Epidemiological understanding of Meigs syndrome supports the importance of early recognition to prevent unnecessary interventions for suspected malignancy and ensures timely surgical management [7].

**Pathophysiology**

The pathophysiology of Meigs syndrome involves mechanisms that lead to ascites and pleural effusions in the presence of a benign ovarian tumor. Pleural effusions are thought to result from the passage of peritoneal fluid through diaphragmatic defects or diaphragmatic lymphatic channels into the pleural space. This transdiaphragmatic migration explains why pleural effusions are often right-sided, as the right hemidiaphragm may have more frequent anatomical openings or thinner tissue [9]. Ascites may develop through several interrelated mechanisms. One proposed mechanism is the leakage of fluid from edematous ovarian fibromas into the peritoneal cavity. Another possibility involves mechanical obstruction, where the tumor compresses pelvic or abdominal lymphatic vessels, leading to impaired drainage and fluid accumulation. Lymphatic blockage and local peritoneal irritation by the tumor may further contribute to the development of ascites [10]. Molecular mediators, particularly vascular endothelial growth factor (VEGF), have been implicated in fluid accumulation. VEGF increases capillary permeability, promoting the movement of fluid from vascular compartments into peritoneal and pleural spaces. Ishiko et al demonstrated significant reductions in VEGF levels in ascitic and pleural fluid following tumor removal, supporting its role in Meigs syndrome [11]. Despite these findings, the exact molecular pathways remain poorly defined. The interplay between mechanical pressure, lymphatic disruption, and biochemical mediators is likely

multifactorial, and ongoing research continues to investigate these processes. A comprehensive understanding of the pathophysiology is essential to inform clinical management, predict patient outcomes, and differentiate Meigs syndrome from malignant ovarian disease.

**Histopathology**

Meigs syndrome is most frequently associated with benign ovarian tumors, including fibromas, thecomas, Brenner tumors, and granulosa cell tumors. Accurate histopathological characterization is essential for differentiating these tumors, guiding surgical management, and predicting prognosis [12]. Fibromas are the most common tumors linked with Meigs syndrome. Histologically, fibromas are composed of spindle-shaped, ovoid, or round cells embedded in a collagen-rich stroma. The degree of cellularity and stromal collagen content can vary, sometimes forming dense, whorled patterns. Mitotic activity is typically low, and atypical features such as nuclear pleomorphism are rare, supporting their benign nature [13]. Fibromas may occasionally present with calcifications or focal edema, which can be identified on imaging or during histological evaluation. Thecomas, in contrast, are characterized by ovoid to round nuclei with pale gray cytoplasm, often exhibiting lipid-laden cells. These tumors originate from ovarian stromal cells with endocrine activity, which can lead to mild estrogen production. Thecomas are generally benign, although rare cases may exhibit proliferative or atypical features [14]. Immunohistochemistry may show expression of inhibin and calretinin, which can assist in distinguishing thecomas from fibromas or other stromal tumors.

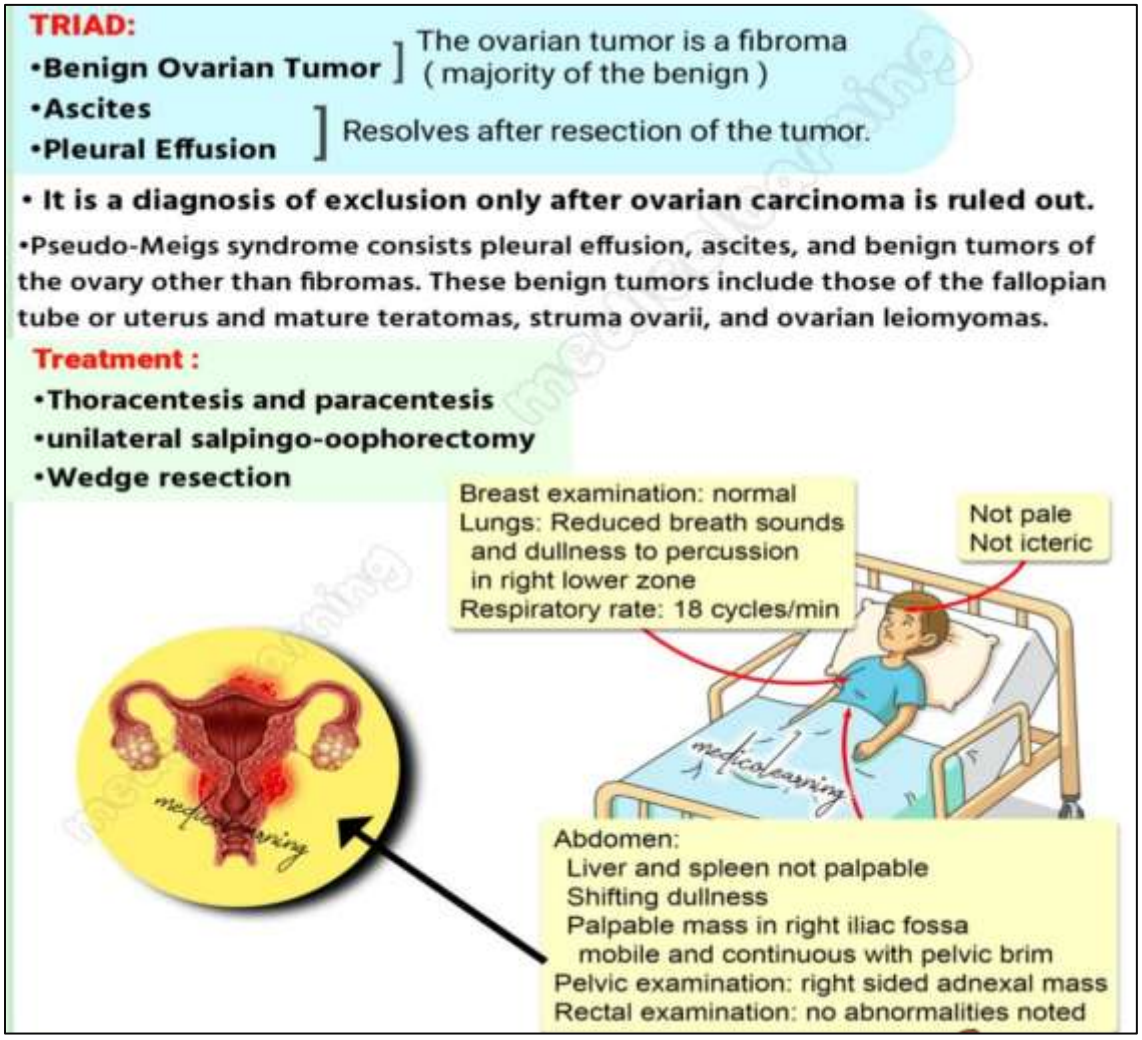


**Fig. 1:** Meigs Syndrome.

Brenner tumors are distinguished by the presence of transitional epithelial cells resembling urinary tract epithelium, surrounded by dense fibrous stroma. They are usually benign but can rarely present as borderline or malignant. Histologic examination typically shows nests of transitional-type epithelial cells with uniform nuclei and abundant cytoplasm within a fibrous matrix. Calcifications, especially in the form of psammoma bodies, may also be observed [15]. Granulosa cell tumors, although less common, are important due to their hormonal activity and malignant potential. Histologically, they are defined by the presence of Call-Exner bodies, eosinophilic fluid-filled spaces surrounded by granulosa cells arranged in a disorganized manner. Nuclear grooves and coffee-bean shaped nuclei are characteristic. Molecular studies reveal that FOXL2 mutations are present in approximately 97% of adult granulosa cell tumors, serving as a reliable diagnostic marker [16]. Overall, histopathological examination remains the definitive method for identifying the type of ovarian tumor in Meigs syndrome. Accurate differentiation between fibromas, thecomas, Brenner tumors, and granulosa cell tumors informs surgical decisions, potential fertility preservation, and long-term follow-up, while confirming the benign nature of the disease that distinguishes it from malignant ovarian neoplasms.

**History and Physical**

Meigs syndrome typically presents in postmenopausal women, with clinical manifestations arising primarily from pleural effusion and ascites [17]. Symptoms related to pleural effusion include dyspnea, dry cough, and occasional chest discomfort. The effusions are most frequently right-sided, although left-sided or bilateral effusions can occur, influencing clinical presentation and detection [4]. Ascites may manifest as progressive abdominal distension, discomfort, or bloating, often prompting initial evaluation for gastrointestinal or hepatic disorders. Physical examination is critical for detecting signs indicative of Meigs syndrome. Adnexal masses may be palpable on pelvic examination, although small tumors can be easily missed. Pulmonary assessment may reveal diminished breath sounds, dullness to percussion, and egophony, indicative of fluid accumulation in the pleural space. Jugular venous distension may occur in cases of significant fluid overload. Abdominal examination may demonstrate a distended abdomen, shifting dullness, and fluid wave, confirming ascites. These nonspecific findings often delay consideration of ovarian pathology, emphasizing the need for heightened clinical suspicion to prevent misdiagnosis [18]. Although Meigs syndrome predominantly affects postmenopausal women, it can rarely present in children and adolescents. In these younger patients, Gorlin syndrome, an autosomal dominant familial cancer syndrome, must be considered. Gorlin syndrome predisposes to multiple neoplasms, including ovarian and cardiac fibromas, as well as basal cell carcinomas, and is associated with skeletal, ophthalmologic, and neurologic abnormalities [19]. Early recognition of Gorlin syndrome in pediatric and adolescent patients allows timely genetic testing, dermatologic surveillance, and radiologic screening to detect neoplasms before symptomatic presentation. For female patients diagnosed with Gorlin syndrome, pelvic ultrasound screening is recommended at menarche or by age 18 to detect ovarian fibromas early. This proactive monitoring is crucial because the presence of ascites or pleural effusion in a young patient may otherwise be misattributed to other systemic or respiratory conditions [20]. Comprehensive evaluation of history and physical examination, combined with awareness of familial syndromes, enables timely diagnosis of Meigs syndrome, guiding appropriate surgical management and reducing unnecessary interventions for presumed malignancy [20].

**Evaluation**

The evaluation of Meigs syndrome requires a structured, multidisciplinary approach that integrates clinical, laboratory, and imaging findings. Because Meigs syndrome is rare and presents with nonspecific signs such as ascites and pleural effusion, obtaining a detailed history and performing a comprehensive physical examination are critical first steps. Patients frequently present with insidious abdominal distension, often associated with mild discomfort or pain, and dyspnea during minimal exertion or even at rest. These symptoms may overlap with cardiac, hepatic, renal, or malignant pathologies, making careful assessment essential. The physical examination should focus on identifying adnexal masses, detecting fluid in the peritoneal or pleural cavities, and evaluating for signs of systemic disease. Examination of the lungs may

reveal diminished breath sounds, dullness on percussion, or egophony over the effusion, while abdominal assessment may demonstrate shifting dullness, fluid wave, or distended abdomen consistent with ascites [19]. Laboratory evaluation serves multiple purposes: to exclude alternative diagnoses, to optimize preoperative status, and to support the eventual diagnosis of Meigs syndrome. Common investigations include a complete blood count to assess for anemia or macrocytosis, comprehensive metabolic panels to evaluate renal and hepatic function, coagulation studies, urinalysis to detect proteinuria, and brain natriuretic peptide for cardiac assessment. These studies help exclude conditions such as liver failure, congestive heart failure, nephrotic syndrome, and hematologic disorders, which may mimic the clinical presentation of Meigs syndrome [19].

Although there are no specific serum markers for benign ovarian tumors, CA-125 levels may be elevated in patients with Meigs syndrome, a phenomenon more commonly associated with ovarian malignancy [21]. Elevated CA-125 levels may occur due to mechanical stimulation of the peritoneum by ascitic fluid, inflammatory processes, or mesothelial cell activation, emphasizing the need for cautious interpretation. Misdiagnosis as ovarian malignancy is frequent when elevated CA-125 coincides with an adnexal mass [22]. Therefore, laboratory findings must always be correlated with imaging and clinical data to avoid unnecessary radical interventions. Imaging is central to the evaluation of Meigs syndrome. Pelvic and abdominal ultrasonography is the initial modality of choice, allowing for assessment of adnexal masses, ascites, and internal tumor characteristics such as septations or irregular margins [23]. Chest radiography provides initial assessment for pleural effusions and excludes pulmonary lesions suggestive of malignancy [9]. Computed tomography (CT) of the chest, abdomen, and pelvis further delineates the anatomy, evaluates for metastases, and rules out hepatic, gastrointestinal, or pulmonary sources of fluid accumulation. CT imaging also aids in surgical planning by identifying tumor size, location, and relationship to surrounding structures. Positron emission tomography combined with CT (PET/CT) using fludeoxyglucose F18 (18F-FDG) can provide additional diagnostic clarity. Benign ovarian tumors typically exhibit low 18F-FDG uptake, whereas malignant masses demonstrate high metabolic activity, allowing differentiation and reducing unnecessary surgical radicality [24]. Imaging findings, in conjunction with physical examination and laboratory studies, guide the decision for definitive surgical intervention. Endoscopic evaluation may be indicated in patients with risk factors for gastrointestinal malignancy or unexplained ascites. Esophagogastroduodenoscopy and colonoscopy help exclude esophageal, gastric, or colonic cancers as potential contributors to fluid accumulation. Negative findings on endoscopy further support the suspicion of a benign ovarian etiology. Thoracentesis and paracentesis serve both diagnostic and therapeutic purposes. Analysis of pleural and peritoneal fluid includes protein, lactate dehydrogenase, cytology, gram stain, and cultures. In Meigs syndrome, pleural and ascitic fluid is most often exudative and devoid of malignant cells, although occasional transudative effusions have been reported [9]. Fluid cytology provides important reassurance in excluding malignancy, guiding the clinical team toward appropriate surgical management rather than systemic oncologic therapy.

**Tuberculosis Screening**

In regions with a higher prevalence of tuberculosis or in patients with risk factors, it is essential to exclude pelvic tuberculosis, which can also present with ascites and pleural effusion. Screening involves skin testing, acid-fast bacillus staining and culture of pleural or peritoneal fluid, and molecular diagnostic assays such as polymerase chain reaction. Timely exclusion of tuberculosis ensures that preoperative management is optimized and unnecessary delays or inappropriate interventions are avoided [25]. A thorough evaluation of Meigs syndrome integrates detailed history, comprehensive physical examination, laboratory studies, imaging, fluid analysis, and selective endoscopy to exclude mimicking pathologies. Multidisciplinary assessment ensures accurate diagnosis, facilitates surgical planning, and prevents unnecessary interventions for suspected malignancy. Definitive diagnosis relies on histopathologic confirmation of a benign ovarian tumor and resolution of ascites and pleural effusions postoperatively. Recognition of the syndrome and appropriate preoperative evaluation optimize patient outcomes and highlight the importance of a systematic, evidence-based approach.

**Treatment / Management**

Management of Meigs syndrome focuses on both curative and symptomatic strategies. Optimal care requires a multidisciplinary approach, incorporating gynecology, nursing, laboratory medicine, family medicine, and psychosocial support. The primary goal is the definitive removal of the benign ovarian tumor while addressing patient-specific needs, including fertility preservation, comorbidities, and overall health status. Surgical excision of the ovarian mass is the mainstay of treatment and provides both curative and diagnostic benefits. Surgery can be performed through laparotomy or minimally invasive techniques such as laparoscopy, depending on tumor size, surgical expertise, and patient factors. Intraoperative frozen section analysis is recommended to confirm benign histology, ensuring that no malignant pathology is overlooked [26]. Postoperative follow-up typically includes imaging and laboratory assessment, particularly monitoring CA-125 levels, which often normalize after tumor removal, confirming both clinical and biochemical resolution [9]. Surgical approach is tailored to the patient's age, reproductive goals, and menopausal status. In young women desiring fertility preservation, unilateral salpingo-oophorectomy is preferred, removing only the affected ovary and fallopian tube. This approach balances curative intent with preservation of reproductive potential. For postmenopausal women, the standard surgical intervention is a total abdominal hysterectomy with bilateral salpingo-oophorectomy. This procedure removes all potential sites for benign ovarian tumors, preventing recurrence and providing comprehensive treatment for postmenopausal patients [27]. Tumor excision results in rapid resolution of ascites and pleural effusion, confirming the diagnosis of Meigs syndrome and relieving associated symptoms such as dyspnea and abdominal distension.

**Symptomatic Treatment**

Not all patients are suitable candidates for surgery. Advanced age, significant comorbidities, or patient preference may preclude operative intervention. In such cases, symptom management becomes the focus of care. Repeated large-volume paracentesis effectively relieves abdominal discomfort and distension caused by ascites, while repeated thoracentesis addresses dyspnea and cough from pleural effusions. These procedures provide temporary relief but require careful monitoring for electrolyte imbalances, infection, and protein depletion. Long-term management options include placement of indwelling abdominal catheters, allowing patients or caregivers to drain ascitic fluid at home, improving quality of life and minimizing repeated hospital visits [28]. Similarly, indwelling pleural catheters offer continuous management of recurrent pleural effusions. Studies have shown that these catheters not only provide adequate symptomatic control but can also lead to spontaneous pleurodesis, resulting in a permanent resolution of effusion without further invasive intervention [29]. Additional options for pleural effusions include chemical or mechanical pleurodesis, which promotes adhesion of the pleural layers and prevents fluid reaccumulation. Comprehensive management also involves patient counseling and supportive care. Nursing teams provide perioperative care, monitor fluid status, and educate patients on catheter use. Laboratory specialists ensure accurate histopathologic diagnosis and monitor biochemical parameters, while family medicine providers coordinate ongoing care and address comorbid conditions. Psychotherapy may support patients coping with anxiety or stress related to the initial suspicion of malignancy or the impact of recurrent symptomatic effusions on daily living. In conclusion, Meigs syndrome management combines definitive surgical intervention for curative intent with tailored symptomatic strategies for patients who cannot undergo surgery. Early recognition, multidisciplinary coordination, and patient-centered planning ensure optimal outcomes, rapid symptom resolution, and avoidance of unnecessary oncologic procedures [29].

**Differential Diagnosis**

The diagnosis of Meigs syndrome requires careful exclusion of other conditions that can mimic its clinical presentation. Definitive confirmation relies on histopathologic analysis of the ovarian mass and observation of the resolution of ascites and pleural effusion following tumor removal. Until these criteria are met, clinicians must systematically consider a broad spectrum of differential diagnoses to avoid mismanagement or unnecessary radical interventions. Ovarian malignancy is the primary condition to exclude because the

presence of an adnexal mass, ascites, pleural effusion, and occasionally elevated serum CA-125 can closely resemble the presentation of Meigs syndrome. Malignant ovarian tumors may require more extensive surgical resection, chemotherapy, or other oncologic interventions. Imaging, tumor markers, and intraoperative frozen section histology help differentiate benign from malignant tumors. Hepatic cirrhosis is another condition that may present with ascites and pleural effusions, particularly when right-sided hydrothorax develops secondary to transdiaphragmatic migration of fluid. Patients with cirrhosis often have additional signs such as jaundice, spider angiomas, hepatomegaly, or a history of chronic liver disease, which can guide differentiation. Laboratory testing, including liver function tests, coagulation studies, and imaging of hepatic vasculature, assists in diagnosis [29].

Nongynecologic malignancies such as pancreatic, gastrointestinal, and lung cancers can also produce ascites and hydrothorax through metastatic spread or peritoneal irritation. Clinical history, imaging including CT or PET/CT, endoscopy, and biopsy are required to exclude these possibilities. Similarly, congestive heart failure and nephrotic syndrome may cause fluid accumulation due to altered hydrostatic or oncotic pressures. Echocardiography, renal function tests, urinalysis, and serum protein evaluation are necessary to distinguish these systemic conditions. Infectious causes such as tuberculosis must be considered in endemic areas or in patients with risk factors. Tuberculosis can involve the peritoneum or pleura, causing ascites and hydrothorax with exudative fluid. Acid-fast bacillus testing, molecular assays, and culture of pleural or peritoneal fluid are essential to rule out this diagnosis. Other rare but relevant differentials include thoracic endometriosis, which may produce recurrent pleural effusions, and pseudo-Meigs syndrome, in which ascites and pleural effusions occur with pelvic or abdominal tumors other than ovarian fibromas. Tumors associated with pseudo-Meigs include benign cysts such as struma ovarii, mucinous cystadenomas, teratomas, uterine leiomyomas, and secondary metastatic ovarian tumors [30]. Finally, Tjalma syndrome, or pseudo-pseudo Meigs syndrome, is a manifestation of systemic lupus erythematosus in which ascites, pleural effusions, and elevated CA-125 occur without any ovarian tumor [8]. Recognition of this condition requires thorough autoimmune workup, including serologic testing for antinuclear antibodies and complement levels. Careful assessment, targeted laboratory studies, imaging, and, ultimately, histopathologic confirmation allow clinicians to distinguish Meigs syndrome from these varied conditions, ensuring appropriate management and avoiding unnecessary radical treatment [8].

**Prognosis**

Meigs syndrome is a benign condition with an excellent prognosis when diagnosed and treated promptly. The key determinant of favorable outcomes is early identification of the ovarian tumor and its surgical removal. Once the tumor is excised, associated pleural effusion and ascites resolve completely, often within days to weeks postoperatively. This rapid resolution distinguishes Meigs syndrome from malignant conditions, where fluid accumulation persists or recurs despite treatment [8]. Patients who undergo surgery for Meigs syndrome experience postoperative life expectancy comparable to that of the general population. Recurrence is extremely rare when the underlying tumor is completely resected, and no additional long-term oncologic therapy is required. Fertility-preserving surgery in younger patients allows maintenance of reproductive function without compromising curative outcomes, further supporting a positive prognosis. In addition to survival, quality of life is typically restored after tumor removal. Preoperative symptoms such as dyspnea, abdominal distension, fatigue, and anxiety about a potential malignancy are relieved. Biochemical markers such as CA-125, if elevated prior to surgery, usually normalize after resection, providing reassurance to both patients and clinicians. Long-term follow-up focuses on routine gynecologic surveillance and monitoring for any new pelvic masses. Patient education about the benign nature of the condition, recognition of recurrence, and adherence to follow-up schedules contributes to sustained positive outcomes. Early intervention, accurate diagnosis, and appropriate surgical management are therefore critical for ensuring the excellent prognosis associated with Meigs syndrome [8].

**Complications**

Although Meigs syndrome itself is benign, failure to recognize and treat the condition can result in significant complications. Patients with untreated ascites or pleural effusions may require repeated

thoracenteses or paracenteses, which carry risks including infection, bleeding, dehydration, pneumothorax, and iatrogenic injury to abdominal organs. Hypoalbuminemia may also develop due to chronic protein loss through recurrent fluid drainage, leading to edema and impaired wound healing. Misdiagnosis of Meigs syndrome as a malignant condition, or vice versa, introduces additional risks. If malignancy is mistaken for Meigs syndrome, delay in oncologic treatment may allow progression of disease, resulting in metastatic spread, cachexia, intestinal obstruction from tumor growth, deep venous thrombosis, and other systemic complications. Conversely, mislabeling benign Meigs syndrome as cancer can subject patients to unnecessary radical surgery, chemotherapy, and radiation, which carry their own short- and long-term morbidities. Even with curative surgery, perioperative complications such as bleeding, infection, anesthesia-related risks, and injury to surrounding structures may occur, particularly in older patients or those with comorbidities. Postoperative monitoring and supportive care are therefore essential to mitigate these risks. Prompt recognition and appropriate management of both the underlying tumor and symptomatic fluid collections prevent these complications, highlighting the importance of accurate diagnosis, careful surgical planning, and coordinated multidisciplinary care [20].

**Consultations**

Management of Meigs syndrome often involves multiple specialty consultations to optimize care. Diagnostic radiology is critical for initial imaging and interpretation of findings suggestive of benign versus malignant ovarian masses. Interventional radiology may assist with paracentesis, thoracentesis, and placement of indwelling peritoneal or pleural catheters for symptomatic relief in non-surgical candidates. Thoracic surgery consultation is indicated for management of pleural effusions or for procedural guidance. Gynecologic oncology plays a central role in surgical planning, tumor removal, and intraoperative assessment through frozen section analysis. Hepatology may provide expertise in paracentesis and fluid management when liver disease or hypoalbuminemia complicates care. Palliative care consultation is recommended for patients who are not candidates for surgery, focusing on symptom management, goals of care discussions, and quality-of-life considerations. Social work is important to assist patients and caregivers with home management of indwelling catheters, ensuring safe handling and monitoring for complications [7].

**Patient Education**

Patient and caregiver education is vital in the management of Meigs syndrome. Individuals should be instructed to seek medical evaluation if they develop new-onset abdominal distension, dyspnea, or unexplained weight loss. Early presentation facilitates timely diagnosis and reduces the risk of unnecessary interventions for suspected malignancy. Once diagnosed, patients should be informed about the benign nature of Meigs syndrome and reassured regarding prognosis. Counseling should emphasize that curative treatment involves tumor removal, which leads to resolution of ascites and pleural effusions. Patients should also be educated about the importance of completing diagnostic evaluation to exclude malignancy, as untreated or misdiagnosed conditions may result in severe complications. Timely referral to gynecologic oncology ensures prompt surgical management, reducing symptom burden and improving outcomes [8].

**Enhancing Healthcare Team Outcomes**

The multidisciplinary nature of Meigs syndrome management requires seamless communication among interprofessional team members. Misdiagnosis or delayed diagnosis may lead to missed curative opportunities or unnecessary aggressive interventions. Primary care clinicians, gynecologists, diagnostic radiologists, interventional radiologists, internists, thoracic surgeons, palliative care specialists, nurses, nurse practitioners, physician assistants, and social workers must coordinate to optimize patient care. Accurate documentation of clinical findings, imaging results, interventions, and patient concerns in the medical record ensures continuity of care. Interprofessional collaboration facilitates timely recognition of benign ovarian tumors, efficient surgical planning, appropriate symptom management, and effective home support for indwelling catheter use. Regular team discussions and shared decision-making enable the

delivery of patient-centered care, maximize efficiency, and enhance overall outcomes, ultimately improving both prognosis and quality of life for patients with Meigs syndrome [27][28][29].

**Conclusion:**

Meigs syndrome remains a rare but clinically significant condition that requires a high index of suspicion to avoid misclassification as ovarian malignancy. The overlap in symptoms—including ascites, pleural effusion, adnexal mass, and possible elevation in CA-125—contributes to frequent diagnostic confusion and the potential for unnecessary aggressive treatment. Accurate diagnosis depends on thorough history taking, comprehensive physical examination, detailed imaging, and careful analysis of pleural and peritoneal fluids to exclude malignancy or infectious etiologies. Histopathologic confirmation following surgical excision remains the gold standard for definitive diagnosis. The pathophysiologic mechanisms involving lymphatic obstruction, peritoneal irritation, and VEGF-mediated vascular permeability provide insight into fluid accumulation and support the rationale for surgical management, which leads to rapid postoperative resolution of effusions. Prognosis is excellent when the underlying benign tumor is removed, with symptom relief, normalization of biochemical markers, and restoration of quality of life. Multidisciplinary collaboration among gynecology, radiology, laboratory medicine, nursing, psychotherapy, and primary care enhances diagnostic accuracy and continuity of care. Patient education and supportive services ensure optimal outcomes. Early intervention, combined with coordinated team-based management, is essential in preventing complications, minimizing morbidity, and ensuring the favorable prognosis that characterizes Meigs syndrome.

**References:**

1. Hou YY, Peng L, Zhou M. Meigs syndrome with pleural effusion as initial manifestation: A case report. World J Clin Cases. 2021 Jul 26;9(21):5972-5979.
2. MEIGS JV. Fibroma of the ovary with ascites and hydrothorax; Meigs' syndrome. Am J Obstet Gynecol. 1954 May;67(5):962-85.
3. Gianarakis M, Verma B, Verma N, Marwaha C, Pollard R, Kondapaneni M, Siraj A, Siddiqi NI. Rare Variant of Meigs Syndrome Associated With Pericardial Effusion. JACC Case Rep. 2023 Jul 19;18:101927.
4. Krenke R, Maskey-Warzechowska M, Korczynski P, Zielinska-Krawczyk M, Klimiuk J, Chazan R, Light RW. Pleural Effusion in Meigs' Syndrome-Transudate or Exudate?: Systematic Review of the Literature. Medicine (Baltimore). 2015 Dec;94(49):e2114.
5. Abdelazim IA, Abu-Faza M, Abdelrazek K, Amer OO, Shikanova S, Zhurabekova G. Ovarian Fibroma Commonly Misdiagnosed as Uterine Leiomyoma. Gynecol Minim Invasive Ther. 2020 Jan-Mar;9(1):36-38.
6. Taniguchi Y, Nishikawa H, Maeda N, Terada Y. Breathlessness, pleural effusions, fibromas, and Meigs syndrome: look beyond the chest and don't delay! Lancet. 2020 Feb 15;395(10223):e32.
7. Nemeth AJ, Patel SK. Meigs syndrome revisited. J Thorac Imaging. 2003 Apr;18(2):100-3.
8. Saha S, Robertson M. Meigs' and Pseudo-Meigs' syndrome. Australas J Ultrasound Med. 2012 Feb;15(1):29-31.
9. Nguyen P, Yazdanpanah O, Schumaker B. Meigs' Versus Pseudo-Meigs' Syndrome: A Case of Pleural Effusion, Ascites, and Ovarian Mass. Cureus. 2020 Aug 12;12(8):e9704.
10. Riker D, Goba D. Ovarian mass, pleural effusion, and ascites: revisiting Meigs syndrome. J Bronchology Interv Pulmonol. 2013 Jan;20(1):48-51.
11. Ishiko O, Yoshida H, Sumi T, Hirai K, Ogita S. Vascular endothelial growth factor levels in pleural and peritoneal fluid in Meigs' syndrome. Eur J Obstet Gynecol Reprod Biol. 2001 Sep;98(1):129-30.
12. Iavarone I, Padovano M, Pasanisi F, Della Corte L, La Mantia E, Ronsini C. Meigs Syndrome and Elevated CA-125: Case Report and Literature Review of an Unusual Presentation Mimicking Ovarian Cancer. Medicina (Kaunas). 2023 Sep 19;59(9)
13. Sivanesaratnam V, Dutta R, Jayalakshmi P. Ovarian fibroma--clinical and histopathological characteristics. Int J Gynaecol Obstet. 1990 Nov;33(3):243-7.

14. Maleki A, Khosravi M, Masrouri A. Ovarian thecoma presenting with acute ovarian torsion in pregnancy; report of a rare case. Clin Case Rep. 2022 Jun;10(6):e5986.
15. Costeira FS, Félix A, Cunha TM. Brenner tumors. Br J Radiol. 2022 Feb 01;95(1130):20210687.
16. Li J, Chu R, Chen Z, Meng J, Yao S, Song K, Kong B. Progress in the management of ovarian granulosa cell tumor: A review. Acta Obstet Gynecol Scand. 2021 Oct;100(10):1771-1778.
17. Fernandez Diaz JJ, Navarro Desentre L. Meigs' Syndrome. N Engl J Med. 2024 Jun 13;390(22):2107.
18. Miyoshi A, Miyatake T, Hara T, Tanaka A, Komura N, Komiya S, Kanao S, Takeda M, Mimura M, Nagamatsu M, Yokoi T. Etiology of Ascites and Pleural Effusion Associated with Ovarian Tumors: Literature Review and Case Reports of Three Ovarian Tumors Presenting with Massive Ascites, but without Peritoneal Dissemination. Case Rep Obstet Gynecol. 2015;2015:414019.
19. Hu X, Li W, Li X, Li D, Cai J, Wang P. $^{18}$F-FDG PET/CT features of Meigs syndrome induced by ovarian sex cord stromal tumors: a retrospective clinical study. Sci Rep. 2024 Jan 03;14(1):347.
20. Scalia AC, Farulla A, Fiocchi F, Alboni C, Torricelli P. Imaging features of uterine and ovarian fibromatosis in Nevoid Basal Cell Carcinoma Syndrome. J Radiol Case Rep. 2018 Sep;12(9):21-30.
21. Tan N, Jin KY, Yang XR, Li CF, Yao J, Zheng H. A case of death of patient with ovarian fibroma combined with Meigs Syndrome and literature review. Diagn Pathol. 2022 Oct 17;17(1):83.
22. Shen Y, Liang Y, Cheng X, Lu W, Xie X, Wan X. Ovarian fibroma/fibrothecoma with elevated serum CA125 level: A cohort of 66 cases. Medicine (Baltimore). 2018 Aug;97(34):e11926.
23. Yuan L, Cui L, Wang J, Gong L. A Case Report of Meigs' Syndrome Caused by Ovarian Fibrothecoma with High Levels of CA125. Int J Womens Health. 2024;16:519-525.
24. Lee ES, Kim TS, Yoo CW, Seo SS, Kim SK. A Case of Meigs' Syndrome: The (18)F-FDG PET/CT Findings. Nucl Med Mol Imaging. 2011 Sep;45(3):229-32.
25. Yang YY, Fung CP, Yu IT, Chiang JH. Genital tuberculosis with peritonitis mimicking Meigs' syndrome: a case report. J Microbiol Immunol Infect. 1999 Sep;32(3):217-21.
26. Yadav S, Tomar R, Verma N, Khurana N, Triathi R. Struma Ovarii with Pseudo-Meigs' Syndrome and Raised Cancer Antigen-125 Levels Masquerading as an Ovarian Carcinoma Case report and literature review. Sultan Qaboos Univ Med J. 2017 May;17(2):e229-e233.
27. Hatoum S, Jarjoura P, Saade C, Naffaa L. Sclerosing Stromal Tumor of the Ovary Presenting as Meigs Syndrome During Childhood. Cureus. 2022 Nov;14(11):e31562.
28. Rosenberg S, Courtney A, Nemcek AA, Omary RA. Comparison of percutaneous management techniques for recurrent malignant ascites. J Vasc Interv Radiol. 2004 Oct;15(10):1129-31.
29. Wahidi MM, Reddy C, Yarmus L, Feller-Kopman D, Musani A, Shepherd RW, Lee H, Bechara R, Lamb C, Shofer S, Mahmood K, Michaud G, Puchalski J, Rafeq S, Cattaneo SM, Mullon J, Leh S, Mayse M, Thomas SM, Peterson B, Light RW. Randomized Trial of Pleural Fluid Drainage Frequency in Patients with Malignant Pleural Effusions. The ASAP Trial. Am J Respir Crit Care Med. 2017 Apr 15;195(8):1050-1057.
30. Wang JD, Yang YF, Zhang XF, Huang J. Systemic lupus erythematosus presenting with progressive massive ascites and CA-125 elevation indicating Tjalma syndrome? A case report. World J Clin Cases. 2022 Sep 16;10(26):9447-9453.