中華民國醫用超音波學會 2024 年第一次學術研討會暨
第 20 屆中區會員代表選舉
113 年 5 月 26 日(星期日)

會長：林中生教授

節目籌備人員：消化系：中山蔡明璋醫師、心臟內科：中榮林維文醫師、中山蕭文智醫師、
婦產科：中山曾志仁醫師、復健科：中山林傳朝醫師

會議地點：中山醫學大學誠愛樓 9 樓第一、二、三演講廳

報到及投票時間：13:00-16:00

報到費：會員/會友免費、非會員 500 元

主辦單位：中華民國醫用超音波學會

協辦單位：中山醫學大學附設醫院

復健科超音波：第二演講廳

Moderator：中山醫大附設醫院中興分院院長林傳朝醫師			
13:30-14:00	State of the Art in Ultrasound Guided Treatment of Spasticity with Botulinum Toxin A	臺中榮民總醫院復健部 部主任 程遠揚醫師	1
14:00-14:10	Discussion		

消化系超音波研討會：第二演講廳

Key Practice of Ultrasound in Gastroenterology

Moderator：中山醫學大學附設醫院肝膽腸胃科蔡明璋主任			
14:10-14:40	Clinical Application of Trans-abdominal Ultrasound in Acute Abdomen	光田醫院 陳俊欽主任	2
14:40-15:10	Recent Advances of Endoscopic Ultrasound in Biliopancreatic Disease	中山醫學大學附設醫院 蘇浩俊醫師	5
15:10-15:30	Coffee Break		
15:30-16:00	Ultrasound Evaluation of Liver Fibrosis: Tissue Elastography and ARFI	彰化基督教醫院 蘇培元醫師	6
16:00-16:30	Evolution of ultrasound-guided Liver Cancer Ablation: My Journey in the Past Two Decades	大里仁愛/長庚醫院 莊伯恒醫師	6
16:30-16:40	Discussion		

婦產科超音波研討會：第三演講廳

Moderator：中山醫學大學附設醫院婦產部曾志仁副院長			
13:30-14:00	Case Report: High Grade Ovarian Serous Carcinoma Mimicking OHSS after IVF treatment	中山醫學大學附設醫院 黃允瑤醫師	7
14:00-14:30	超音波在婦科癌症的運用	中山醫學大學附設醫院 張浩榕醫師	8
14:30-15:00	常見婦科疾病的超音波應用	中山醫學大學附設醫院 楊茜雯醫師	9
15:00-15:10	Discussion		
15:10-15:30	Coffee break		

15:30-16:00	Application of Ultrasound in Urogynecology	中山醫學大學附設醫院 曾慶煒醫師	12
16:00-16:30	產前超音波檢查子宮頸長度與子宮頸閉鎖不全	中山醫學大學附設醫院 林瑜萱醫師	22
	Basic Sonography Fetal Assessment and Soft Markers Finding	中山醫學大學附設醫院 葉敏儒醫師	23
16:30-16:40	Discussion		

心臟超音波研討會：第一演講廳

題目: Critical Care Echocardiography

Moderator：中山醫學大學林中生教授			
13:30-14:00	Echocardiographic Evaluation of the Right Heart Disease in Intensive Care Unit	中山醫學大學附設醫院 蕭文智醫師	24
14:00-14:30	Resuscitative TEE in the Emergency Department	彰濱秀傳醫院 陳家慶醫師	24
14:30-15:00	Hidden Cause of Severe Pulmonary Hypertension, a Pitfalls of Echocardiography	中山醫學大學附設醫院 朱軒緯醫師	25
15:00-15:10	Discussion		
15:10-15:30	Coffee Break		
Moderator 中山醫學大學蔡青峰主任			
15:30-16:00	Echocardiography in Mechanical Circulatory Support (MCS)	臺中榮民總醫院心臟血管中心 林彥伯醫師	26
16:00-16:30	To Wean or not to Wean: Echocardiography Evaluation during Weaning from Mechanical Ventilation	彰化基督教醫院 黃祺元醫師	26
16:30-16:40	Discussion		

醫學會	積分	醫學會	積分
台灣醫學會	**3.2 分**	台灣家庭醫學醫學會	**乙類 1 點**
台灣內科醫學會	**5 分**	台灣外科醫學會	**10 分**
中華民國放射線醫學會	**4 分**	台灣婦產科醫學會	**B 類 2 分**
台灣消化系醫學會	**B 類 2 分**	台灣急救加護醫學會	**3 分**
台灣消化系內視鏡醫學會	**B 類 1 分**	台灣老年學暨老年醫學會	**乙類 2 分**
中華民國重症醫學會	**2 分**	台灣胸腔及心臟血管外科學會	**2.5 分**
台灣消化系外科醫學會	**B 類 3 分**	台灣心臟胸腔暨血管麻醉醫學會	**3 分**
中華民國心臟學會	**B 類 15 分**	台灣老人急重症醫學會	**乙類 5 分**
台灣神經學學會	**1.5 分**	台灣復健醫學會	**1 點**
中華民國神經放射線醫學會	**1 分**	台灣醫事檢驗學會	**3 點**
中華民國癌症醫學會	不通過	公務人員繼續教育認證	**4 小時**
台灣專科護理師學會	**3 點**	超音波繼續教育課程認證 (會員/會友報到即可，不須簽名)	**25 分**
護理師/護士積分認證	**3 點**		

State of the Art in Ultrasound Guided Treatment of Spasticity with Botulinum Toxin A

程遠揚主任
臺中榮民總醫院復健醫學部

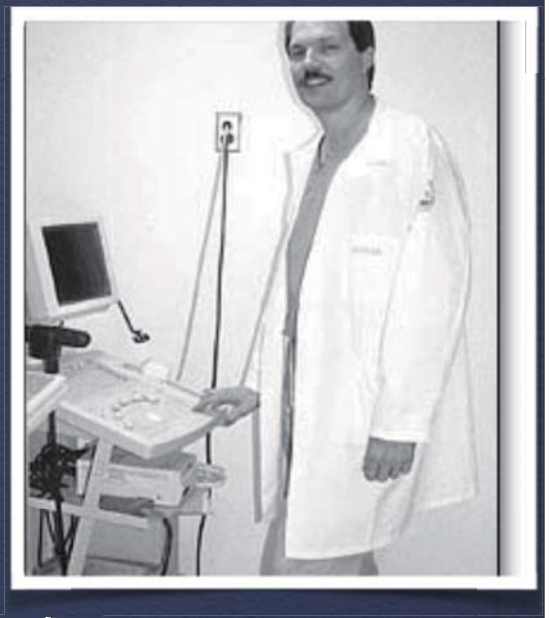
Spasticity is a common sequela of several kinds of upper motor neuron diseases, which can cause significant hinderance in managing daily activities for these patients. Botulinum toxin A injection had been class I level of recommendation with level of evidence A in managing spasticity in 2016 Guidelines for Adult Stroke Rehabilitation and Recovery. To achieve satisfactory outcome, several crucial issues should be paid attention. First of all, the goal of the patient and his caregiver should be confirmed and addressed. Second, always use ultrasound guidance if the target muscle lies between layers of other muscles, near large arteries or nerves, or near vital structures that incorrect needle placement may cause significant injury. Finally, optimal dosage of botulinum toxin should be used.

Clinical application of Trans-abdominal ultrasound in acute abdomen

超音波檢查在腹痛的臨床經驗

"Medicine is learned at the bedside and not in the classroom"

(Sir William Osler 1849 – 1919)



光田綜合醫院 胃腸肝膽科 陳俊欽醫師

陳俊欽 醫師簡介

- 現任 ：光田綜合醫院 胃腸肝膽科 主治醫師 主任
- 癌症委員會 肝癌 胃癌召集人
- 台北醫學大學畢業
- 台北馬偕醫院Best Intern
- 台北新光醫院Best Resident
- 台北新光醫院 消化系內科
- 桃園敏盛醫院消化系內科 內科部主任
- 台中林新醫院 消化系內科病房主任 肝病中心 內視鏡中心主任
- 台中 中港澄清醫院 胃腸肝膽科 癌症委員會召委
- 台灣消化系醫學會 內視鏡醫學會 內科醫學會 專科醫師
- 台灣醫學會 師資培育認證醫師
- 專長 ：消化系統癌症診斷及治療，B，C肝炎病毒治療，巨型胃腸瘜肉切除，內視鏡膽管取石術，消化道及膽道支架置放術，內視鏡止血術，幽門螺旋桿菌根除治療， 急性腹痛超音波診斷

- **急性或慢性腹痛是消化系內科 外科 急診科 及 基層診所醫師 平常在看診時常遇到的問題**

- 腹部除了很大部分的消化道器官 — **胃，小腸，大腸，肝，膽，胰，脾 外， 也包括泌尿道系統，女性生殖系統 及 腹膜，血管 系統** 。因此 腹痛是因為什麼原因或疾病引起 考驗看診醫師的診斷能力。

- 若能快速正確診斷 也才真正幫助病人正確找出治療方式 。**尤其是一些外科急症 如急性盲腸炎，膽囊炎，胃腸穿孔，腸套疊，腸壞死，腫瘤破裂出血，輸卵管卵巢扭轉，子宮外孕, 主動脈剝離…等**。若能及早診斷 大多可以挽救病人的生命。

- **腹部超音波是醫師的最佳助手** 若能熟悉超音波檢查的技巧及累積經驗 必能協助醫師在面對腹痛的病人能有快速診斷的能力 以安排後續安全有效的治療

- 藉由個人近30年的超音波檢查經驗分享 希望能提供各位會員對提升超音波診斷急慢性腹痛能力的重視！

Recent Advances of Endoscopic Ultrasound in Biliopancreatic Disease

蘇浩俊醫師
中山醫學大學附設醫院肝膽胃腸科

Endoscopic ultrasound (EUS) is a useful modality for finding biliopancreatic lesions, characterizing them and even performing tissue acquisition. Since the endoscope could get very close to the biliopancreatic system from the upper gastrointestinal tract, this modality possesses a stronger ability than computed tomography and magnetic resonance imaging to detect small (<1 cm) biliopancreatic lesions.

Two types of echoendoscope are commonly used: radial and linear types, and the biliopancreatic system is examined from three locations. The left lobe of the liver (S2, S3), caudate lobe, partial S4 of the liver, gallbladder, left kidney, left adrenal gland, spleen and pancreatic neck/body/tail, are mainly examined from the stomach. The pancreatic head and the common bile duct are mainly examined from the duodenal bulb. In addition to the common bile duct and the main pancreatic duct, the ampulla of Vater can be examined from the descending part of the duodenum.

EUS-guided tissue acquisition (EUS-TA) is classified as aspiration or biopsy based on the types of needles being used. The procedure is performed using a linear type echoendoscope. Currently, fine needle biopsy has almost replaced fine needle aspiration because intact tissue cores can be obtained by the biopsy needle, enabling pathologic and cytologic diagnoses. The sensitivity and specificity of EUS-TA are 85-89% and 96-99%, respectively, with a 2% seeding rate. It is generally used for the diagnosis of pancreatic tumors, lymphadenopathy, and subepithelial tumors.

Apart from tissue acquisition, EUS-guided intervention has been developed over decades to treat biliopancreatic diseases. EUS-guided transmural drainage has become a standard management for complications of pancreatitis. It can effectively control infection and alleviate symptoms from pseudocysts or walled-off necrosis. EUS-guided biliary drainage is a procedure that creates a transmural fistula between the biliary system and the upper gastrointestinal tract. This includes EUS-guided hepaticogastrostomy, EUS-guided choledochoduodenostomy, and EUS-guided gallbladder drainage. These procedures are considered alternative methods when endoscopic transpapillary drainage fails or the patient is not a candidate for surgery. EUS-assisted rendezvous method is a procedure that combines EUS and endoscopic retrograde cholangiopancreatography to facilitate cannulation of the common bile duct or main pancreatic duct under circumstances of difficult cannulation.

Ultrasound Evaluation of Liver Fibrosis: Tissue Elastography and ARFI

蘇培元主任
彰化基督教醫院消化系中心

Liver elastography, a non-invasive method for measuring liver stiffness, is employed extensively across various countries. "Rule of Five" enables the early detection of compensated advanced chronic liver disease (cALD) and clinically significant portal hypertension (CSPH). This early identification allows clinicians to administer non-selective β-blockers to patients with cirrhosis and CSPH, thereby reducing the risk of decompensation. As viral hepatitis becomes increasingly controlled, steatotic liver disease (SLD) emerges as a significant concern. Determining how to utilize liver elastography to identify patients with SLD at high risk for non-alcoholic steatohepatitis (NASH) has become a critical priority. This lecture will concentrate on the precision of liver elastography under various clinical conditions and its effectiveness in the longitudinal monitoring of patients through elastography.

Evolution of Ultrasound-guided Liver Cancer Ablation: My Journey in the Past Two Decades

莊伯恒醫師
大里仁愛醫院胃腸肝膽科

Liver cancer was found in the advanced stage before. After the introduction of ultrasound, physicians used it to find liver cancer. Chemical agent injection to liver cancer was found effective under the guidance of ultrasound and later thermal ablation with different energy and electrodes made a more effective ablation and was written into the guideline to be the fourth pillar of cancer therapy. Contrast agents were introduced to diagnosis or guidance but were used in limitation without reimbursement. Artificial ascites or pleural effusion were introduced to protect organs near ablation for safety. Fusion/navigation for precise ablation has become popular recently. Anesthesia also has an important role in good ablation. My medical process has just been experienced through these learning processes and I will introduce them to you about how to be an interventional oncologist.

Case Report: High Grade Ovarian Serous Carcinoma Mimicking OHSS after IVF Treatment

黃允瑤醫師
中山醫學大學附設醫院婦產部

A healthy 38 year old woman, nulligravida initially visited our internal thoracic OPD due to exertional dyspnea and shortness of breath. She had recently underwent 2 cycles of IVF treatment. During her first cycle, an ovarian cyst was found about 8x10cm. Contents were aspirated and sent for cytologic diagnosis; cellular atypia was reported. She then underwent a second IVF cycle. One week after TVOR, she complained of lower abdominal pain and fullness and a right ovarian cyst about 12x12cm was found again. The contents of the cyst were again aspirated for pathological diagnosis. It was negative for malignant cells. Her symptoms were treated as OHSS at the IVF clinic. However, one month later her symptoms fail to improve and she continued to experience shortness of breath and chest tightness. She then visited our Internal Thoracist for help where right pleural effusion and ascites were found. Thoracentesis aspirated 200ml from the right lung and parecentesis of 2500cc was done. A chest CT scan was performed 4 days later; findings include a 14x8x10.9cm hypodense cystic mass with soft tissue component originated from the right adnexa. Also there was bilateral pleural effusion and ascites. Ovarian cancer suspecting a serous type cystadenocarcinoma was told. There were also some soft tissue density lesions along gastrocolic ligament and bowel wall suspicious of carcinomatosis and metastatic lymphadenopathies in aortocaval space. CT scan reported cT3CN1M1. She had elevated CA125 (682). She then underwent a laparotomy, where frozen section revealed malignancy. A conservative debulking surgery was performed, include right salpingo-oophorectomy, left salpingectomy, left ovarian cystectomy, tumour debulking, omentectomy and enterolysis. Her final diagnosis was ovarian high grade serous carcinoma, with multiple distant lymph node metastases, suspicious pleural metastasis and peritoneal carcinomatosis, T2bN1M!, stage IV, status post conservative debulking surgery. The patient is currently undergoing chemotherapy with carboplatin and taxol. Target therapy with lynparza and CIK cell therapy also arranged.

超音波在婦科癌症的運用

張浩榕醫師
中山醫學大學附設醫院婦產科

Ultrasound plays a crucial role in the diagnosis and monitoring of gynecological cancers, offering non-invasive, real-time, and accurate imaging of the uterus, ovaries, and even the cervix. Compared to CT scans and MRI, ultrasound provides physicians with easier access and dynamic evaluation. Early detection of abnormalities through ultrasound can greatly benefit patients in subsequent diagnosis and treatment. The following discussion will focus on uterine, ovarian, and cervical cancers, with reference to recent literature and clinical cases.

常見婦科疾病的超音波應用

中山醫學大學附設醫院婦產部楊茜雯醫師

子宮

- 成年女性子宮大小約5x7公分，子宮頸長度約3公分。
- 子宮體與子宮頸比例依年齡而不同：
- 嬰兒期1:2、青春期1:1、成人2:1
- 由漿膜層、肌肉層、黏膜層（內膜層）組成。

輸卵管

- 為一對細長彎曲的管狀器官，與卵巢相鄰。
- 正常情況下，超音波無法顯示。

卵巢

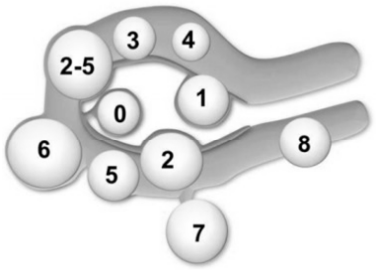
- 位於子宮兩側，輸卵管後下方，外觀呈扁橢圓形。
- 育齡其女性卵巢大小約3x4x1公分，隨年齡及月經週期而變化，內部有圓形無回升的濾泡。

Uterine myoma

- 由平滑肌組成，女性生殖器最常見的良性腫瘤
- Type: subserosal, intramural, subnucosal, broad ligament
- Degenaration: 供血障礙引起
  - Hyaline degeneration, Cystic degeneration, Red degeneration, Fatty degeneration, Calcification degeneration, Necrotic degeneration, Septic degeneration
- Malignant change

Uterine myoma – sono finding

- 子宮變大或型態改變
- Hypoechoic, isoechoic, or hyperechoic



Adenomyosis

- 子宮內膜異位症，侵入子宮肌層（myometrium）。
- 瀰漫型、侷限型（肌腺瘤，無明顯邊界）

- Sono findings
- 子宮變大
- 子宮壁增厚，hyperechoic
- 內膜被擠壓

Endometrial polyp

- 常見的瘤樣病變，由局部增生的腺體及間質組成
- 基底部寬大或是有蒂並向子宮腔內突出

- Sono findings
- Homogeneous hyperechoic ，局部性的團塊
- Multiple cystic change

Ovarian tumor

- Simple cyst
- Functional cyst: follicular cyst, corpus luteum cyst,…
- Endometrioma
- Teratoma

Simple cyst

- 良性病變
- 可能自行消退

- Sono findings
- 壁薄而光滑
- 無回聲，後方回聲增強

Corpus luteum cyst

- 功能性囊腫：排卵後濾泡形成黃體，因濾泡液或血液堆積而形成。

- Sono findings
- Unilocular
- Round
- 網絮狀，隨時間聚集

Endometrioma

- 子宮內膜異位症、巧克力囊腫
- 單側、雙側
- 單個、多個

- Sono findings
- 圓型、橢圓形、不規則形
- Thick wall
- Homogeneous hyperechoic or anechoic

Teratoma

- 生殖細胞來源的腫瘤，常見於育齡婦女，雙側的機率是10~15%，易併發卵巢扭轉。
- 含有脂肪、毛髮、牙齒。

- Sono findings
- Heterogeneous hyperechoic
- Rokitansky nodule or dermoid plug
- Echogenic, shadowing calcific or dental (tooth) components
- Fluid-fluid level
- Multiple thin, echogenic bands caused by the hair in the cyst cavity

TOA (tubo-ovarian abscess)

- 骨盆腔急性感染
- 發燒、腹痛

- Sono findings
- Multilocular complex mass
- Septations, and irregular thick walls

好發族群

- Age
- Menopause
- Pregnant

臨床症狀

- 肌瘤、肌腺症
- 月經異常、腹部腫塊、壓迫症狀

- 卵巢腫瘤
- 經痛、腹部劇痛、發燒、性交後腹痛、懷孕

中山醫學大學附設醫院
Chung Shan Medical University Hospital

Application of ultrasound in Urogynecology

Speaker: 中山附設醫院婦產科
曾慶煒醫師
Email: rachelfiberchang@gmail.com

宗旨 醫人 醫病 醫心　願景 國際級醫學中心　目標 感動服務 卓越品質 創新教研 永續發展

曾慶煒 醫師 簡介

- 中山醫學大學附設醫院婦產科住院醫師及總醫師(2014年8月至2019年7月)
- 上海第一婦嬰人民醫院培訓醫師（2018年3月~2018年4月）
- 天主教若瑟醫療財團法人若瑟醫院 主治醫師（2021年1月~2021年12月）
- 中山醫學大學附設醫院婦產科主治醫師（2022年1月~至今）

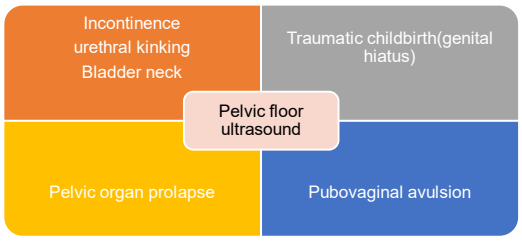
Treat patients holistically.

Ultrasound in Gynecology

- Obstetrics
- Gynecology
- Urogynecology

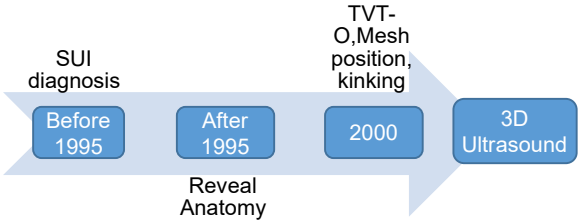
Treat patients holistically.

4 Phases



Treat patients holistically.

Timeline of application of ultrasound in urogynecology



Treat patients holistically.

Applicability of Perineal Sonography in Anatomical Evaluation of Bladder Neck in Women with and without Genuine Stress Incontinence

Gin-Den Chen, MD,[1] Tsaung-Hsien Su, MD,[2] Long-Yau Lin, MD[1]

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Abstract: Thirty-seven patients with proven genuine stress incontinence (GSI) underwent ultrasound study to evaluate the bladder neck position relative to the symphysis pubis. Sixty-five continent women including 40 parous and 25 nulliparous women were recruited as a control group. Several parameters were found to be statistically different between incontinent and control groups ($P < 0.01$). If 28 degrees or 13 mm were used as the cut-off point for rotational angle (RA) and descent of bladder neck (DBN), the sensitivity, specificity, and positive and negative predictive values were 73.0%, 76.9%, 64.3%, and 83.3%, respectively. The specificity and positive predictive value for GSI increased to 83.1% and 67.6% if these two parameters were used together. Perineal sonography is valuable in assessing anatomic change of the bladder neck, but it is not a sensitive tool for predicting GSI. © 1997 John Wiley & Sons, Inc.
J Clin Ultrasound **25**:189–194, 1997
Keywords: perineal sonography; rotational angle; bladder neck descent; urinary stress incontinence

Treat patients holistically.

6

Perineal ultrasound for evaluating the bladder neck in urinary stress incontinence

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Affiliations + expand

PMID: 7824234 DOI: 10.1016/0029-7844(94)00369-O

Obstet Gynecol. 1995 Feb;85(2):220-4. doi: 10.1016/0029-7844(94)00369-O

Abstract

Objective: To assess the reproducibility of a new method for evaluation of the bladder neck with perineal ultrasound and to compare it with lateral chain urethrocystography.

Methods: In the first phase, two investigators examined 40 patients using perineal ultrasound to assess the reproducibility of a new measurement method for the determination of the bladder neck position. In the second phase, 60 patients were evaluated by perineal ultrasound and lateral chain urethrocystography.

Results: With perineal ultrasound, there was good interexaminer agreement for determining bladder neck position, funneling, and bladder neck descent at rest and during the Valsalva maneuver, but not for the posterior angle beta during straining. Comparison of sonographic and x-ray assessments showed good agreement for the bladder neck position at rest, but not during Valsalva, whereas the posterior angle, funneling, and bladder base descent differed between the two techniques at rest as well as during Valsalva.

Conclusion: With our new method for determining the position of the bladder neck, perineal ultrasound is a reliable technique that allows reproducible static and dynamic evaluation. Lateral chain urethrocystography is superior to perineal ultrasound only if bladder neck funneling is the aim of the evaluation; it is inferior if bladder neck mobility during maximal Valsalva is being investigated.

> Ultraschall Med. 1996 Dec;17(6):285-8. doi: 10.1055/s-2007-1003200.

[Comparison of gynecologic and perineal ultrasound examination of women with stress incontinence]

[Article in German]
D Fink [1], G Schär, D Perucchini, U Haller

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PMID: 9082555 DOI: 10.1055/s-2007-1003200

Ultraschall Med. 1996 Dec;17(6):285-8. doi: 10.1055/s-2007-1003200

Abstract

A COMPARISON AIM: To determine how well results of gynecological and perineal sonographic examinations of the urethrovesical junction correlate.

Method: 186 women with urodynamically verified stress incontinence underwent a perineal ultrasound and then a gynecologic examination. Standardised procedures were used for both. The findings of the gynecological examination were compared with measurement values and morphological findings from perineal ultrasound.

Results: There was agreement on the cystocele grade in 69% of the cases. The position of the bladder neck as assessed by the ultrasound image revealed typical measurement values for this disorder. The expected bladder neck funneling was detected in 49% of these women.

Conclusion: In stress-incontinent women there is good correlation between the findings of the gynecological and perineal sonographic examinations. Bladder neck funneling-a morphological sign of stress incontinence-can be detected with perineal ultrasound in nearly one-half of the cases.

Review > Int Urogynecol J. 2011 Sep;22(9):1085-97. doi: 10.1007/s00192-011-1402-7. Epub 2011 Apr 22.

Pelvic floor ultrasound in incontinence: what's in it for the surgeon?

Hans Peter Dietz [1]

Affiliations + expand

PMID: 21512829 DOI: 10.1007/s00192-011-1402-7

Abstract

There is increasing interest in imaging techniques such as magnetic resonance and ultrasound amongst pelvic floor surgeons, as evidenced by the number of workshops and conference presentations in this field. Ultrasound is employed more commonly, due to much lower costs, greater accessibility and practicability. Consequently, this review focuses on sonography. At this time, imaging is probably under-utilised in urogynaecology and female urology, although it has the potential to greatly benefit our patients. In this review, I will outline the main uses of imaging in the work-up of women with urinary incontinence, before and after treatment, and focus on areas in which this benefit to patients and clinicians is most evident.

Measuring the angle of the subpubic arch using three-dimensional transperineal ultrasound scan: intraoperator repeatability and interoperator reproducibility

Sarah Choi [1], Symphorosa Shing Chee Chan, Daljit Singh Sahota, Tak Yeung Leung

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PMID: 22875664 DOI: 10.1055/s-0032-1322518

Am J Perinatol. 2013 Mar;30(3):191-6.

Abstract

Objective: A method of measuring the subpubic arch angle using three-dimensional transperineal ultrasound scan (3DTUS) was developed, and the intraoperator repeatability and interoperator reproducibility were investigated.

Study design: Using 3DTUS, volume data sets were obtained from the nine nulliparous pregnant women by three operators (A, B, and C) in each of the three study sessions. With volume reconstruction, a plane along the inferior edges of bilateral inferior pubic rami was obtained on the axial section. The angle made between the innermost points of both inferior pubic rami at the level of urethra and the inferoposterior point of symphysis pubis was measured as the subpubic arch angle. The intraoperator repeatability of the experienced operator (A) and the interoperator reproducibility between A, B, and C were assessed by the repeatability coefficient and the interoperator intraclass correlation (ICC), respectively.

Results: A total of 27 women were examined. The intraoperator repeatability was 4.73 degrees. The overall interoperator ICC was 0.860, and increased from 0.794 in the first session to 0.945 in the third session.

Conclusion: With 3DTUS, it is feasible to measure subpubic arch angle with satisfactory intraoperator repeatability and interoperator reproducibility. This easy-to-learn technique extends the possibilities of future pelvimetry research using 3DTUS.

Review > Clin Obstet Gynecol. 2017 Mar;60(1):58-81. doi: 10.1097/GRF.0000000000000264.

Pelvic Floor Ultrasound: A Review

Hans Peter Dietz [1]

Affiliations + expand

PMID: 28005595 DOI: 10.1097/GRF.0000000000000264

Abstract

Female pelvic floor dysfunction encompasses a number of prevalent conditions and includes pelvic organ prolapse, urinary and fecal incontinence, obstructed defecation, and sexual dysfunction. In most cases neither etiology nor pathophysiology are well understood. Imaging has great potential to enhance both research and clinical management capabilities, and to date this potential is underutilized. Of the available techniques such as x-ray, computed tomography, magnetic resonance imaging, and ultrasound, the latter is generally superior for pelvic floor imaging, especially in the form of perineal or translabial imaging. The technique is safe, simple, cheap, easily accessible and provides high spatial and temporal resolutions.

Review > Best Pract Res Clin Obstet Gynaecol. 2019 Jan:54:12-30. doi: 10.1016/j.bpobgyn.2018.06.006. Epub 2018 Jun 28.

Ultrasound in the assessment of pelvic organ prolapse

Hans Peter Dietz [1]

Affiliations + expand

PMID: 30082146 DOI: 10.1016/j.bpobgyn.2018.06.006

Abstract

Imaging is increasingly being used in urogynaecology. Because of low cost and universal availability, ultrasound (US) is the most commonly used diagnostic modality, which allows the observation of manoeuvres such as Valsalva and pelvic floor muscle contraction in real time. The ability to see beyond surface anatomy is particularly important in the posterior compartment and in obstructed defecation where this method may replace defecation proctography. Imaging is especially useful in the form of 3D/4D multiplanar and tomographic translabial US, as these modalities give access to the axial plane and the levator ani. This allows assessment of both avulsion, i.e. major maternal birth trauma, and hiatal overdistension, i.e. ballooning. Both are major risk factors for both prolapse and prolapse recurrence. This review will outline current clinical utility, introduce recent research in the respective field and provide an overview of likely future utility of imaging in the investigation of pelvic organ prolapse.

Review > Curr Opin Obstet Gynecol. 2020 Dec;32(6):431-440.
doi: 10.1097/GCO.0000000000000659.

Ultrasound in the investigation of pelvic floor disorders

Hans Peter Dietz [1]

Affiliations + expand

PMID: 32833745 DOI: 10.1097/GCO.0000000000000659

Abstract

Purpose of review

Translabial ultrasound with systems designed for obstetric imaging is now the commonest diagnostic modality in pelvic floor medicine. This review will outline current clinical utility and introduce recent research in the investigation of pelvic floor disorders, such as urinary and anal incontinence, pelvic organ prolapse, obstructed defecation and of complications after sling and mesh surgery.

Recent findings

There has been significant progress in standardization of imaging methods, and the International Urogynecology Association has developed an online course encouraging this standardization. Tomographic methods are increasingly used for imaging of the levator ani and anal canal. Several comparative studies have investigated concordance between tomographic translabial imaging and competing methods, and the widespread availability of equipment has facilitated interethnic comparative studies. Several meta- analyses have investigated risk factors for major pelvic floor trauma and the role of pelvic floor abnormalities in prolapse recurrence after surgery.

Summary

The widespread use of imaging has the potential to change the management of pelvic floor morbidity, such as urinary and anal incontinence, pelvic organ prolapse and related conditions. Even in units and locations where the required systems are not easily accessible, the insights provided by real-time imaging will enhance diagnostic and therapeutic capabilities.

Evaluation using Ultrasound

- The basic structures to include for the pelvic floor ultrasound
  - Pubic symphysis
  - Bladder
  - Urethra
  - Vagina
  - Uterus (if present)
  - The endoanal canal
  - The levator plate
  - ***The levator ani muscle complex***

Techniques of ultrasound

- The integrity of the **levator ani muscle complex** is usually evaluated by documenting its ***insertion*** at the inferior portion of the ***pubic symphysis*** and measuring the dimensions of the ***levator hiatus***.
- Proper identification of all relevant anatomic structures
  - More than one modality may be required
  - A two-dimensional (2D) assessment of the pelvic floor
  - Dynamic assessment

Dynamic assessment

at rest (static assessment)

+

squeeze and Valsalva maneuvers (dynamic assessment)

→ 3D and 4D assessments (if available) → Anal sphincter

Box 13.1

Indications for Pelvic Floor Ultrasound

- Urinary incontinence
- Recurrent urinary tract infections
- Persistent dysuria
- Symptoms of voiding dysfunction
- Symptoms of pelvic organ prolapse
- Obstructed defecation
- Anal incontinence
- Vaginal discharge or bleeding after pelvic floor surgery
- Pelvic or vaginal pain after pelvic floor surgery
- Dyspareunia
- Vaginal cyst or mass
- Synthetic implants (slings, meshes, and bulking agents)
- Levator ani muscle assessment after childbirth
- Obstetric perineal injury
- Obstetric anal sphincter injury
- Perineal cyst or mass

(From AIUM/IUGA practice parameter for the performance of Urogynecological ultrasound examinations. Int Urogynecol J 30, 1389–1400 (2019). https://doi.org/10.1007/s00192-019-03954-5.)

Ultrasound

- Perineal ultrasound
- Introital ultrasound
- Endovaginal ultrasound

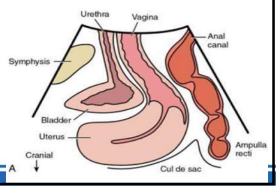
Perineal ultrasound

- Patient position: dorsal lithotomy position/ lateral postion
- Preparation: Emptying bladder before examination
- Probe: 2D perineal ultrasound include a B-mode capable 2D ultrasound system and a 3.5- to 6-MHz transducer
- → Midsagittal view (placed on the perineum/vulva firmly) → Coronal view (rotating the transducer 90 degrees, by placing a dorsal inclination on the transducer)
- Parting the labia and varying the degree of pressure of the transducer may improve image quality.
- 3 phases: at rest, during squeeze, and with the Valsalva maneuver
- Visualize in real-time

Perineal ultrasound

- Midsagittal view
- From ventral to dorsal
  - Symphysis pubis (SP)
  - Urethra
  - Bladder neck
  - Vaginal canal
  - Uterus
  - Cervix
  - Anorectal canal
  - The central portion of the puborectalis muscle

- FIG. 13.8A, A schematic diagram and (B), the ultrasound image showing a midsagittal view on two-dimensional transperineal ultrasound

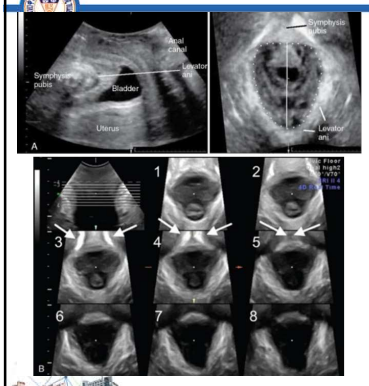


Perineal ultrasound

- Measure the degree of pelvic prolapse at rest and with Valsalva maneuvers
- Hypermobility of the bladder neck (subjective and objective)
- Pelvic floor dyssynergia may be noted as a paradoxical movement of the pelvic floor during these maneuvers
- An atonic pelvic floor is characterized by a lack of levator plate movement with prompted squeeze.
- Observation of coordinated pelvic floor lift by ultrasound may be indicative of pelvic floor dysfunction.
- The anal canal and sphincter complex (coronal view)

3D Perineal ultrasound

- To perform the examination, the patient is placed in the same position as described for 2D ultrasound.
- The 3D-capable transducer is placed firmly on the perineum, maintaining a midsagittal orientation.
- The transducer is then held in place while the images are obtained at rest, during squeeze, and with the Valsalva maneuver. The 3D postprocessing of the images can be performed with the appropriate software.
- The 4D imaging entails the real-time acquisition of data to produce and save image cineloops. To perform 4D ultrasound, images are recorded during a prompted maneuver such as a squeeze or maximal Valsalva maneuver.



- FIG. 13.9A, Translabial three-dimensional ultrasound images in the midsagittal plane (left) and oblique axial plane (right) showing identification of the plane of minimal hiatal dimensions on Valsalva maneuver. The horizontal line in the image on the left illustrates the identification of the plane of minimal hiatal dimensions in the midsagittal plane and is equivalent to the vertical line in the image on the right. The dotted line in the image on the right illustrates the minimal hiatal area on Valsalva, which was measured at 19 cm2, indicating normal distensibility of the hiatus. B, Tomographic ultrasound imaging in the C (axial) plane for assessment of levator integrity. Slice 1 is the caudal slice; slice 8 is the most cranial slice. The arrows indicate the symphysis pubis.

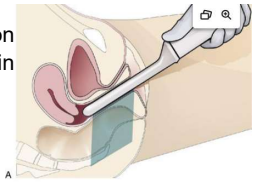
Introital pelvic floor ultrasound

- Introital pelvic floor ultrasound requires an endocavitary front fire transducer.
- Initial static image
  - Urethrovesical junction and ARA
- A dynamic assessment of the pelvic floor
  - Levator ani complex (squee and Valsalva maneuvers, followed by a 3D assessme
- Anal sphincter complex (Axial plane)

FIG. 13.10 Transperineal view showing an intact anal sphincter complex. *EAS*, External anal sphincter; *IAS*, internal anal sphincter.

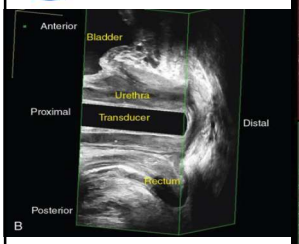
Endovaginal ultrasound (EVUS)

- Pelvic floor assessment
  - a 2D static and dynamic assessment, 3D
  - In the dorsal lithotomy position
  - comfortable amount of urine in the bladder
  - The transducer: in a neutral position, avoiding excessive pressure on the surrounding structures
  - Performed at rest, with a Valsalva maneuver, and during pelvic floor muscle contraction.

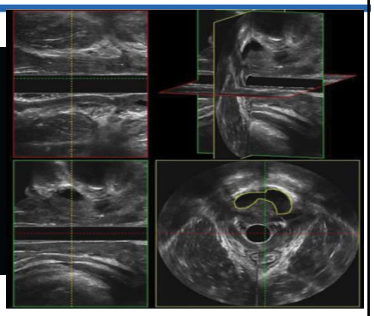


Video

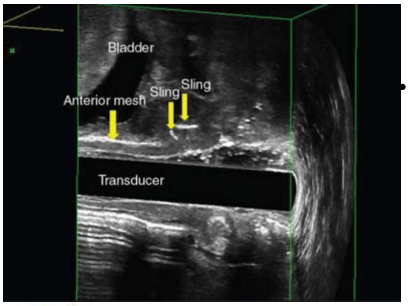
- Three-dimensional endovaginal ultrasound showing minimal levator hiatus, anorectal angle, and levator ani muscles.
- https://ebooks.health.elsevier.com/9780323826181/video/chapters/9780323826181XXX13X0/41c45852-50c5-411f-a59b-4b0203d06d6a



- FIG. 13.11A, Schematic of placement of three-dimensional (3D) endovaginal transducer. B, 3D endovaginal ultrasound volume.



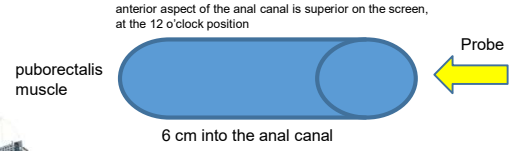
- FIG. 13.12Three views of urethra diverticulum on the x, y, and z planes using three-dimensional endovaginal sonography.



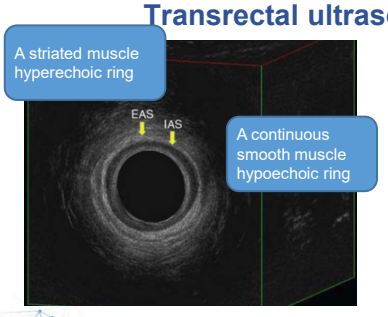
- FIG. 13.13 Three-dimensional ultrasound showing anterior mesh and two midurethral slings.

Transrectal ultrasound

- A high-resolution, multifrequency, mechanical 360-degree rotational transducer
- Evaluation of anal sphincter defect or pathology → "gold standard"
- Patient position: lithotomy, lateral, or prone position



Transrectal ultrasound



- FIG. 13.14Example of a normal three-dimensional endoanal ultrasound. EAS, External anal sphincter; IAS, internal anal sphincter.
- The conjoint longitudinal muscle consists of a mixed echogenicity layer between the two sphincters

Applications of ultrasound in evaluating disorders of the lower urinary tract and pelvic floor

- Anterior compartment
- Urinary incontinence
- Urethral and periurethral abnormalities
- Posterior compartment
- Postoperative findings and synthetic mesh materials

Anterior compartment via Transperineal ultrasound

- Via transperineal ultrasounds and endovaginal ultrasound
- Transperineal ultrasound: bladder neck descent, urethral hypermobility, cystocele, and cystourethrocele.
- The position of the urethrovesical junction at rest and at maximal Valsalva may be measured relative to the central line of the Symphysis pubis or its inferoposterior margin.

Anterior compartment via Transperineal ultrasound

- Hypermobility of urethra (On Valsalva)
  - the bladder neck and proximal urethra →rotate in the inferior and posterior directions
  - distal urethra → remains stable (tethering to the SP and pelvic side walls)
  - Defination: no standard measurement !!! → movement cutoffs → 20, 25, or 30 mm
- Hypomobility of the urethra. → ***increases the risk of failure*** after placement of a midurethral sling
  - Lo et al. (2016),
    - Repeat sling surgery for UI in patients → limited urethral mobility diagnosed by either Q-tip test or ultrasound → greater risk of sling failure *4 ↑
  - Viereck et al. (2015)
    - TVT-O : decreased bladder neck mobility of 10 mm or less on ultrasound → risk of failure *2 ↑

Anterior compartment via endovaginal ultrasound

- A 3D EVUS → provide a detailed anatomic depiction of anterior compartment structures
  - The trigone
  - The compressor urethra
  - The urogenital sphincter
  - Urethral complex: urethral width, length, and volume
  - Vaginal cysts and masses, including Skene's gland cysts, urethral diverticula, and Garner's duct cysts
  - Ectopic and dystopic ureters

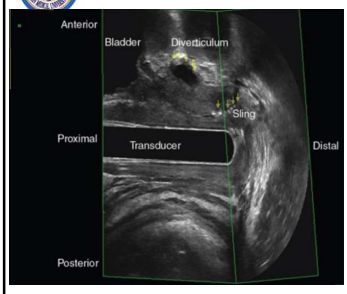
Urinary incontinence

- Various ultrasound techniques and findings
  - The measurement of a postvoid residual
  - Evaluation of the bladder (by perineal ultrasound)
  - Urethral hypermobility
  - Bladder funneling (in asymptomatic women or Urge incontinence)

NO significant clinical benefit in the standard evaluation of UI

Urethral and periurethral abnormalities

- A urethral diverticulum
  - A localized outpouching of the urethral mucosa into the surrounding nonurothelial tissues
  - Mainly in adult women
  - Elusive lower urinary tract symptoms (e.g., UI, dysuria, dyspareunia, vaginal mass)
  - Often overlooked → urethral calculus formation, chronic or recurrent urinary tract infections, or, rarely, malignant transformation



- FIG. 13.15Three-dimensional ultrasound volume showing the location of a urethral diverticulum and a midurethral sling (yellow arrows).

Contrast-enhanced radiography (e.g., voiding cystourethrography, retrograde double-balloon positive pressure urethrography)

- Invasive
- Technically difficult
- Only able to visualize diverticula that are patent enough to allow filling with contrast material

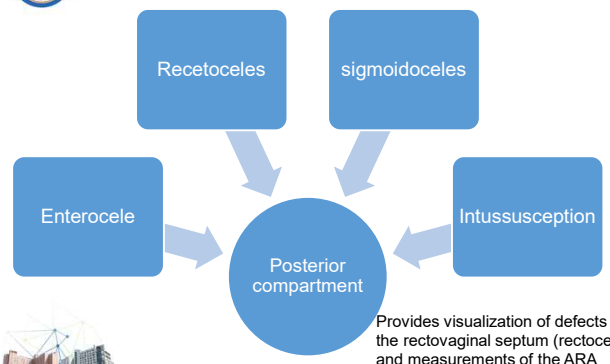
MRI or ultrasound

Urethral and periurethral abnormalities

- Ultrasound can help differentiate a diverticulum from other periurethral cystic lesions
- Ectopic ureters
- Calcifications
- Injected material
- Urethral tumors
- Vaginal masses
- Detrusor hypertrophy (bladder wall thickness ⇔detrusor instability)

Very useful in surgical planning with invaluable information →shape, size, and location in relation to the urethra and bladder.

Posterior compartment



Provides visualization of defects of the rectovaginal septum (rectocele) and measurements of the ARA

Posterior compartment - Rectocele

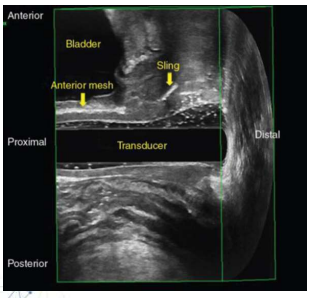
- True rectocele is defined as the herniation of the anterior rectal wall into the vagina
- Definitions of rectocele in defecography (measuring the depth of the rectocele perpendicular to the expected line of contour of the rectal wall.)
  - 1st Degree: < 1 cm in depth
  - 2nd degree: 2-4 cm in depth
  - 3rd degree: > 4 cm in depth
- During Valsalva
  - Descent of an enterocele
  - Movement of the puborectalis and ARA to evaluate for pelvic floor dyssynergy
  - Visualization of intussusception.

Posterior compartment

Enterocele	- A hernia of the most inferior point of the abdominal cavity into the vagina or pouch of Douglas. - downward movement of abdominal contents into the vagina, ventral to the rectal ampulla and anal canal
Sigmoidocele	seen by differentiating hyperechoic stool movement from the surrounding tissue
Intussusception	the rectal wall telescopes into the rectal lumen, and may involve the rectal mucosa or the full thickness of the rectal wall
Pelvic floor dyssynergy	- Lack of normal relaxation of the puborectalis muscle during defecation - A difficult condition to verify through clinical examination. - Visualized as narrowing of the ARA, shortening of the levator hiatus, and thickening of the puborectalis muscle

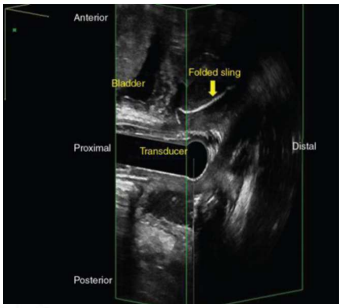
Postoperative findings and synthetic mesh materials

- Ultrasound is the best imaging modality for visualizing synthetic vaginal mesh implants
- Polypropylene → highly echogenic on ultrasound
- Determine the size, shape, position, distortion, and mobility of the implants
- Difficult to discern implanted mesh (which may be shrunken, contracted, or folded) from the surrounding scar tissue by palpating
- Video 13.3 shows a 3D EVUS illustrating the details of vaginal mesh and a sling. In this case, the patient was diagnosed with mesh erosion on cystoscopy after gross hematuria. She had a prior anterior vaginal mesh and sling, and the 3D ultrasound identified the left arm of the vaginal mesh in the bladder.



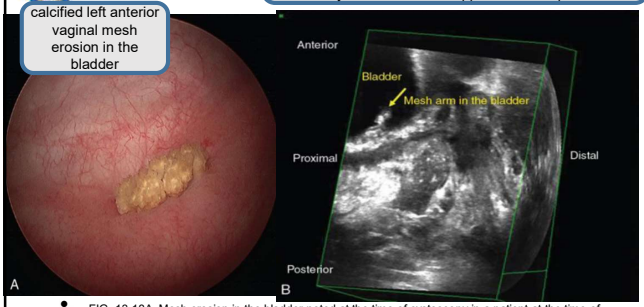
- FIG. 13.16Three-dimensional ultrasound volume. Anterior vaginal mesh and slings are labeled

In the case of midurethral slings, ultrasound can help distinguish transobturator versus retropubic slings. A 3D ultrasound is helpful in locating and "mapping" the location of the synthetic material on axial, sagittal, and coronal images relative to the bladder neck.

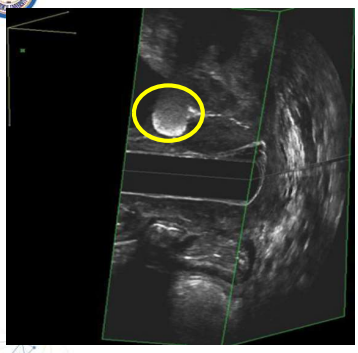


- FIG. 13.17A folded midurethral sling is noted on three-dimensional ultrasound in a patient complaining of voiding dysfunction with an elevated postvoid residual.

This can be helpful in planning a procedure to remove permanent synthetic materials in the absence of an operative report, or as adjunctive imaging in cases where the synthetic materials appear to be displaced.



- FIG. 13.18A, Mesh erosion in the bladder noted at the time of cystoscopy in a patient at the time of gross hematuria workup. This same patient had a history of anterior vaginal mesh and sling placement. B, Three- dimensional ultrasound of this same patient allowed for visualization of the anterior vaginal mesh, confirmed as the area of mesh noted in the bladder.



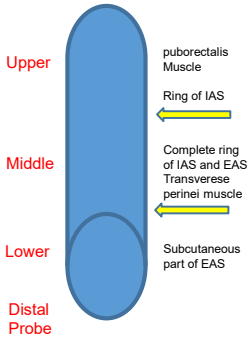
- FIG. 13.19Three-dimensional ultrasound. Sagittal view of urethral bulking agent noted as a hyperechoic sphere.

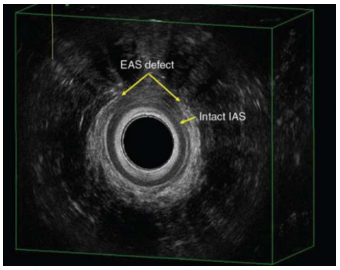
Postoperative findings and synthetic mesh materials

- Video 13.3 shows a 3D EVUS illustrating the details of vaginal mesh and a sling. In this case, the patient was diagnosed with mesh erosion on cystoscopy after gross hematuria. She had a prior anterior vaginal mesh and sling, and the 3D ultrasound identified the left arm of the vaginal mesh in the bladder.

Endoanal ultrasound – Fecal incontinence

- The gold standard for morphological assessment of the anal canal
- Diagnostic test for fecal incontinence after a traumatic childbirth
- Axial plane: upper, middle, and lower

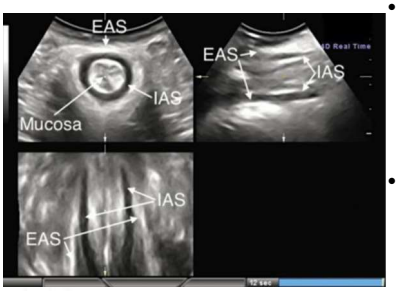




- FIG. 13.20Three- dimensional endoanal ultrasound showing an intact internal anal sphincter (hypoechoic ring) and a defect of the external anal sphincter (hyperechoic) from the 10 to the 2 o'clock positions. IAS, Internal anal sphincter; EAS, external anal sphincter.
- By defining the margins of disruption, ultrasound provides invaluable information for the surgeon if surgical repair is considered.

Endoanal ultrasound

- Video 13.4 shows an example of 3D endoanal ultrasound with an intact IAS and an EAS defect from about 10 to 2 o'clock.



- FIG. 13.21Orthogonal views of external anal sphincter and internal anal sphincter and anal mucosa on three-dimensional/four-dimensional translabial sphincter imaging.
- Transperineal imaging of the anal sphincter. The advantage of an exoanal approach is that it reduces patient discomfort while minimizing distortion of the anal sphincter canal.

Comparative Study > Int Urogynecol J. 2016 Dec;27(12):1899-1903.
doi: 10.1007/s00192-016-3055-z. Epub 2016 Jun 1.

The evolution of transperineal ultrasound findings the external anal sphincter during the first years after childbirth

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PMID: 27250832 DOI: 10.1007/s00192-016-3055-z

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產前超音波檢查子宮頸長度與子宮頸閉鎖不全

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已知子宮頸閉鎖不全是可能會造成早產的原因。通過超音波測量子宮頸長度，可以預測無症狀孕婦是否會發生早產。根據美國婦產醫學會的建議，即使是無早產病史的孕婦，也應在妊娠 18 到 22+6/7 週進行子宮頸長度測量，而對於有早產病史的孕婦，則應在 16 週就開始。這次報告將分享產前超音波在測量子宮頸提供早產預防之角色，並提供一些實際案例。

Basic Sonography Fetal Assessment and Soft Markers Finding

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Ultrasound in obstetrics provides invaluable insights into fetal development and maternal health. Basic sonography fetal assessment plays a crucial role in monitoring pregnancy, detecting anomalies, and guiding clinical management.

Sonography fetal assessment include biometric measurements, fetal anatomy evaluation, and placental assessment. Biometric measurements such as biparietal diameter (BPD), head circumference (HC), abdominal circumference(AC), and femur length(FL) are essential for estimating gestational age and assessing fetal growth. Detailed fetal anatomy evaluation involves visualizing various anatomical structures, including the brain, heart, spine, limbs, and abdominal organs, to identify any structural abnormalities. Additionally, placental assessment assesses placental location, size, and morphology, providing information about fetal well-being and pregnancy complications such as placental insufficiency.

Soft markers are sonographic findings that may indicate an increased risk of chromosomal abnormalities or other fetal conditions. Common soft markers include increased nuchal translucency, echogenic intracardiac foci, choroid plexus cysts, renal pelvis dilatation, and echogenic bowel. While soft markers are often benign and resolve spontaneously, their presence may warrant further diagnostic evaluation, such as genetic counseling, invasive testing, or advanced imaging modalities.

Sonography fetal assessment is a cornerstone of prenatal care, offering insights into fetal well-being and early detection of anomalies. Soft markers findings add complexity to prenatal diagnosis, highlighting the importance of careful interpretation and individualized management strategies.

Echocardiographic Evaluation of the Right Heart Disease in Intensive Care Unit

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Acute dysfunction of the right ventricle (RV) can cause and exacerbate many common critical illnesses, including acute respiratory distress syndrome, pulmonary embolism, acute myocardial infarction, and complications following cardiac surgery. Several supportive therapies, such as mechanical ventilation and fluid management, may worsen RV dysfunction, potentially leading to aggravated shock conditions. Patients presenting with right heart (RH) failure often exhibit complex and aberrant cardio-pulmonary physiology, with symptoms varying widely.

Recently, there has been growing interest in evaluating the RV. Advances in echocardiographic techniques and technology have significantly enhanced our ability to assess the RV both qualitatively and quantitatively. Echocardiographic measures, such as the right ventricular fractional area of change, tricuspid annular plane systolic excursion, and tissue Doppler imaging help for assessment of RV function. These techniques offer valuable diagnostic and prognostic insights into a wide range of clinical conditions, including pulmonary hypertension and congestive heart failure. Echocardiography is set to become the foremost modality for RV evaluation.

Resuscitative TEE in Emergency Department

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Speckle tracking echocardiography (STE) is a sophisticated echocardiographic method that quantifies the deformation and function of the myocardium. Recently, the incorporation of STE with transesophageal echocardiography (TEE) has been recognized as a promising approach for evaluating cardiac function and deformation during cardiopulmonary resuscitation (CPR). Three-dimensional (3D)-STE can provide a more comprehensive quantitation of LV geometry and function. To our knowledge, there is currently no evidence available regarding the application of 3D-STE in patients with cardiac arrest. We illustrated the use of TEE combined with

3D-STE (Philips QLAB 3D quantification advance, Philips Healthcare, USA) in 2 patients with cardiac arrest, revealing stroke volume and ejection fraction measurements at various locations of the area of maximal compression (AMC). Rapid application of 3D-STE in the documentation of the severity of occlusion in each coronary artery is also feasible in patients with 3v-CAD before cardiac angiography. The bull-eye image can help cardiologists set the priorities of angiography.

Hidden Cause of Severe Pulmonary Hypertension, a Pitfalls of Echocardiography

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Case Presentation: A 47-year-old male with a history of liver cirrhosis, autoimmune-induced hepatitis, and recurrent esophageal varices presented with worsening dyspnea on exertion, eventually progressing to dyspnea at rest. Initial investigations highlighted severe pulmonary hypertension, mild mitral regurgitation (MR), and suspicion of sinus of Valsalva rupture with a left-to-right shunt. Despite therapeutic interventions, including Revatio and Concor, and investigations for autoimmune disorders, the patient's symptoms persisted. Further echocardiographic follow-up aimed at ruling out ventricular septal defect (VSD) eventually led to the identification of a Gerbode defect, prompting successful transcatheter repair.
Discussion: The Gerbode defect, an abnormal shunt from the left ventricle to the right atrium, can lead to significant hemodynamic consequences and severe PH. This case underscores the critical role of comprehensive echocardiographic evaluation in patients with unexplained severe PH, highlighting the potential for echocardiographic pitfalls and the necessity of considering rare defects in the differential diagnosis.
Conclusion: Critical care echocardiography plays a pivotal role in uncovering hidden cardiac anomalies contributing to severe pulmonary hypertension. This case of a Gerbode defect illustrates the importance of thorough and repeated echocardiographic assessments to ensure accurate diagnosis and effective management of complex cardiovascular conditions.

Echocardiography in Mechanical Circulatory Support (MCS)

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Initially, triage of a patient with shock is performed in ER based on pre-hospital information. Then, initial diagnosis of cardiogenic shock was made by blood gas, ECG, and Echo (RUSH exam), and evaluation of shock severity and trend. Echocardiogram can frequently use in evaluate LV, RV function, recovery of native heart functions, signs of aortic or mitral valve regurgitation, pericardial effusion, LV thrombus, and the correct placement of the device to avoid complications. From initial evaluation of the proper mechanical device to weaning devices, echography plays an important role.

To Wean or not to Wean: Echocardiography Evaluation during Weaning from Mechanical Ventilation

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Weaning from mechanical ventilation is a challenging step during recovery from critical illness. Here we discuss multiple parameters of transthoracic echocardiography associated to successful weaning outcome, and other variants such as whether LVEF and preload related to weaning from mechanical ventilation, and medication which may or may notboost the process of weaning duration or weaning successful rate.