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Ultrasound diagnosis: a case of gastrointestinal stromal tumor with paraneoplastic syndrome

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To the Editor,

A 78-year-old female patient was admitted due to black stools for over a month and 4 kg weight loss. Gastric ultrasound (US) revealed a solid hypoechoic mass on the lesser curvature of the stomach, measuring about 3.1×4.0 cm (fig 1a) with abundant blood flow signals within the mass on color Doppler examination. Contrast-enhanced US (CEUS) indicated a lesion in the gastric region, measuring approximately 4.4×3.8 cm, with heterogeneous low enhancement and peripheral enhancement (fig 1b). Multiple brownish, round nodules appeared on her skin within a short time, raised above the surface, cauliflower-like in appearance, firm to the touch, and painless. The largest nodule, approximately 2 cm in diameter, was located on the left anterior chest wall (fig 1c). Subsequently, the patient underwent US-guided biopsy of the gastric lesion using a 16G biopsy needle, with tissue obtained via the liver (fig 1d). Immunohistochemical analysis of the ultrasound-guided biopsy tissue revealed CD117 (+), DOG1 (+), CD34 (+), and a Ki67 index of 5%, consistent with a diagnosis of gastrointestinal stromal tumor (GIST). The patient underwent laparoscopic partial gastrectomy, and the postoperative pathology confirmed GIST. Three months after the partial gastrectomy, the skin lesions reduced in size. The pathological result after the removal of a skin mass was seborrheic keratosis.

GIST is a common mesenchymal tumor of the gastrointestinal tract and can occur in any part of the digestive system [1]. CEUS combined with US-guided biopsy allows for the acquisition of high-quality tissue samples, thereby facilitating an accurate pathological diagnosis.

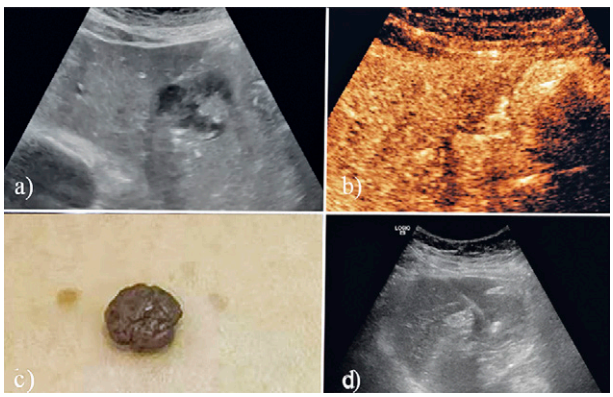

Fig 1. a) A solid hypoechoic mass on the lesser curvature of the gastric body, originating from the gastric muscularis propria, protrudes outward from the gastric lumen. The internal echoes are heterogeneous, with the surrounding gastric wall layers remaining distinctly defined; b) CEUS reveals a gastric lesion with uneven hypoenhancement. No perfusion defects are observed within the lesion, while enhancement is noted around its periphery; c) Brownish roundish nodule on the left anterior chest wall, elevated above the skin surface, cauliflower-like, about 2 cm in diameter; d) Under ultrasound guidance, a percutaneous biopsy of the gastric lesion, passing through a portion of the liver was performed.

Paraneoplastic syndrome is a clinical manifestation caused by abnormal substances secreted by tumor cells, with paraneoplastic skin presentations being relatively rare [2]. Leser-Trélat is a rare skin manifestation of paraneoplastic syndrome, characterized by seborrheic keratosis associated with malignant tumors. These lesions appear suddenly, increase in number and size, and are often associated with malignancies such as those of the colon, stomach, breast, pancreas, and lung [3]. In this case, the patient's skin lesions developed in parallel with tumor progression, consistent with the diagnosis of Leser-Trélat sign in paraneoplastic syndrome.

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Ultrasonographic and pathological findings of intrathyroidal thymic carcinoma

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To the Editor,

An 82-year-old female was admitted due to a cervical mass accompanied by a 7-day history of discomfort during swallowing. Physical examination revealed a hard, prominent, and well-defined left anterior cervical mass. High-frequency ultrasound (US) found a left thyroid lobe mass with irregular, ill-defined margins, hypoechoic and heterogeneous aspect (sheet-like hypoechoic area and floating light spot within) (fig 1a). Color Doppler US displayed moderate blood flow signals (fig 1b). Computed tomography (CT) demonstrated a low-density mass in the left thyroid lobe with heterogeneous density, irregular contour, and indistinct margin, measuring approximately 45x39 mm. Notably, patchy calcification was observed, with CT value ranging from 46 to 69 Hu (fig 1c). Finally, the patient underwent surgical resection, and postoperative pathological examination confirmed the diagnosis of intrathyroidal thymic carcinoma (fig 1d). Immunohistochemical staining was positive for CK, CK19, CK5/6, and P63, while it was negative for TP0, TTF-1, Tg, Galectin-3, CD56, CgA, Syn, and EMA. In situ hybridization for EBER was also non-reactive. Notably, a high expression of Ki-67 was detected. Unfortunately, 4 years after surgery, the patient developed lung metastasis. However, at a 6-year postoperative follow-up, the patient remained alive.

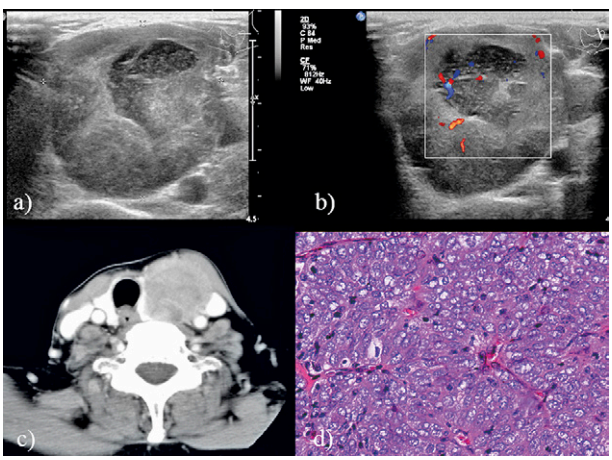

Fig 1. Intrathyroidal thymic carcinoma. a) Grayscale ultrasound showed an 38x38 mm irregular, ill-defined, hypoechoic, and heterogeneous mass with a sheet-like hypoechoic area and floating light spot within and moderate blood flow signals (b); c) CT showed the mass was low-density, heterogeneous density, irregular contour, and indistinct margin with patchy calcification; d) Hematoxylin-eosin staining showed the tissue exhibits lobular growth patterns, characterized by varying sizes. Within these lobes, there are cells resembling ground glass, accompanied by a sparse population of lymphocytes, and the nucleolus is not readily discernible.

Intrathyroidal thymic carcinoma, also known as thyroid cancer with thymic differentiation, is a rare malignant tumor arising from thymic epithelial cells embedded within thyroid tissue. The majority of the patients present with painless neck masses, often involving the lower pole of the thyroid gland, where ectopic thymic tissue or

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residual gill sacs are frequently encountered. Due to the relatively indolent nature of intrathyroidal thymic carcinoma, some patients may only experience significant compression symptoms, such as dyspnea and dysphagia, once the tumor has significantly enlarged [1]. On US, intrathyroidal thymic carcinoma typically appears as large hypoechoic nodules with irregular or lobulated shapes, sometimes exhibiting clear or unclear boundaries with the thyroid capsule. Calcification or cystic components are uncommon, and blood flow signals may be sparse. CT reveals nodular soft tissue density masses with unclear margins and heterogeneous density, rarely accompanied by cystic necrosis or calcification. Enhanced CT shows mild, uneven enhancement, which is typically lower than that of surrounding normal tissue [2]. Surgical resection remains the primary treatment modality with postoperative decisions regarding radiotherapy, chemotherapy, and immunotherapy guided by pathological tissue analysis and clinical staging [3].

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Ultrasound findings of the right thigh rectus femoris muscle intramuscular myxoma

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To the Editor,

A 35-year-old man presented with a muscle mass in his right thigh for 20 days. There was no history of trauma. No redness, fever, or tenderness was found at clinical examination. A computed tomography scan revealed a cyst located between the muscle groups of the anterior right thigh, measuring approximately 32x26mm with a low-density appearance. Ultrasound examination found a 37x21mm mass within the rectus femoris muscle of the right thigh, anechoic with focal hypoechoic areas, posterior acoustic shadowing and no calcification. Adjacent to this area was a tendon-like echo, triangular and well-defined, without detectable blood flow. Sonograms showed

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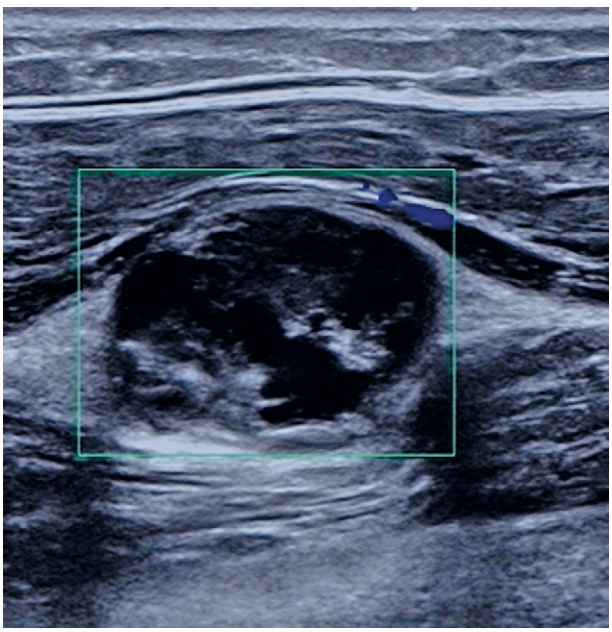

Fig 1. Ultrasound indicated a 37x21mm mass within the rectus femoris muscle of the right thigh, anechoic echoes and its internal echo is turbid. Sonograms show “bright rim” and “bright cap”.

peripheral hyperechoic rim and bright rim sign. Heterougenous posterior acoustic shadowing (fig 1). Postoperative pathology confirmed an intramuscular myxoma (IM) in the thigh.

IM is a rare benign soft tissue tumor, primarily affecting the musculoskeletal system, with an incidence rate of 0.1-0.13 per 100,000 people. It is most frequently diagnosed in individuals aged 40 to 70, showing a higher prevalence in females. While the thigh is the most common site of occurrence (50% of cases), IM can also appear in the upper arm, calf, and buttocks [1-2]. Girish G et al conducted a study where they found that the sonographic "bright rim" and "bright cap" signs were observed in 5 out of 6 cases of IM (83%). The "bright rim sign" refers to a peripheral area of increased echogenicity, while the "bright cap sign" describes a triangular hyperechoic region adjacent to the mass. The sonograms displayed a heterogeneous hypoechoic texture for the myxoma, along with a surrounding hyperechoic rim, known as the bright rim sign [3]. Generally, IM are slow-growing, painless masses situated within large skeletal muscles and are often incidentally discovered. The standard treatment involves complete surgical removal of the tumor with clear margins. Histopathological examination is the definitive method for diagnosis. Based on the pathological results, reviewing the ultrasound images, it is confirmed that the "bright rim sign" and "bright cap sign" do exist.

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A case of eosinophilic cystitis misdiagnosed by ultrasound

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To the Editor,

A 62-year-old male patient presented to our hospital with the main complaint of "dysuria and intermittent gross hematuria for one year", with symptoms recently aggravated and frequent hematuria. The patient had no significant physical abnormalities on examination. Urinalysis confirmed the hematuia. Transabdominal color Doppler ultrasound (US) showed uneven thickening of the bladder wall, several irregular hypoechoic protrusions on the wall, the largest being 42x27mm, with rough edges and calcification, and spot-like blood flow signals inside (fig 1a). Transrectal color Doppler US showed that the boundary between hypoechoic and prostate was not clear, and a small amount of blood flow signal could be seen passing between them (fig 1b). Conclusion: bladder wall thickening, bladder cancer to be investigated; cancer involved prostate is not excluded. After admission, the patient underwent surgical treatment for the bladder mass, during which the bladder mass and part of the bladder were removed (fig 1c). Pathological findings showed eosinophilic cystitis (EC) (fig 1d).

EC is a rare inflammatory disease of the bladder [1]. US examination showed EC as a tumor-like mass, which was often misdiagnosed as bladder malignancy. EC was first described independently by Brown and Palubinskas in 1960. Its etiology and pathogenesis are still unclear, and it is believed that BRAFi 463T gene mutation leads

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to molecular defects in hematopoietic stem cells or myeloid cells [2]. The incidence of EC is low and can be seen in patients of all ages, with no gender differences. Dysuria, hematuria and pain are common symptoms of the disease. Eosinophilic cystitis is a histological diagnosis characterized by eosinophilic infiltration of the bladder wall, mucosal fibrosis, and myonecrosis. EC imaging findings are nonspecific, and cystoscopic biopsy is required to confirm the diagnosis. EC is a benign disease, but the tumor-like manifestations of its lesions can easily be misdiagnosed as malignant bladder tumors by imaging examination. Learning and understanding the typical ultrasonographic manifestations of EC can help sonographers broaden the diagnostic ideas of bladder diseases and avoid misdiagnosis of such diseases.

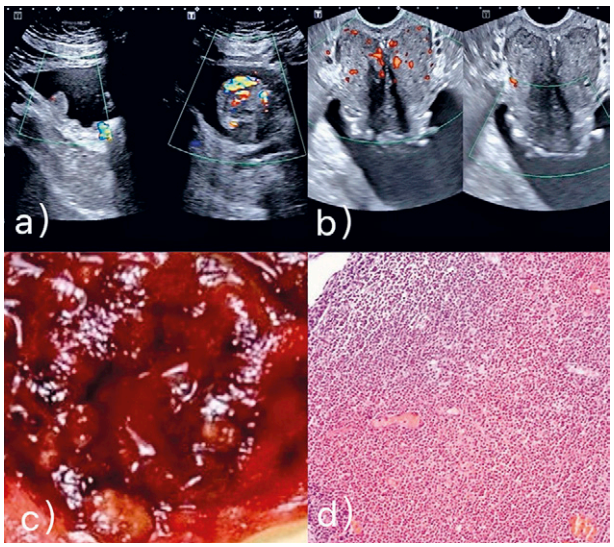

Fig 1. a) TAUS showed uneven thickening of the bladder wall, several irregular hypoechoic protrusions on the wall with rough edges and calcification, and spot-like blood flow signals inside; b) TRUS showed that the boundary between hypoechoic and prostate was not clear; c) The bladder wall in the resection area showed irregular swelling, surface ulceration, hemorrhage and necrosis; d) Microscopically, the bladder wall showed eosinophilic infiltration, mucosal fibrosis, and myonecrosis.

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The tricuspid leaflets severe dehiscence after tricuspid rigid ring annuloplasty

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To the Editor,

We report the case of a 36-year-old male patient admitted with decreased exercise tolerance and lower extremity edema in the last two months. The patient underwent myxectomy and tricuspid annuloplasty for right atrial myxoma two years ago in the local hospital. The patient was admitted to our institution due to recurrent severe tricuspid regurgitation. He was scheduled for tricuspid

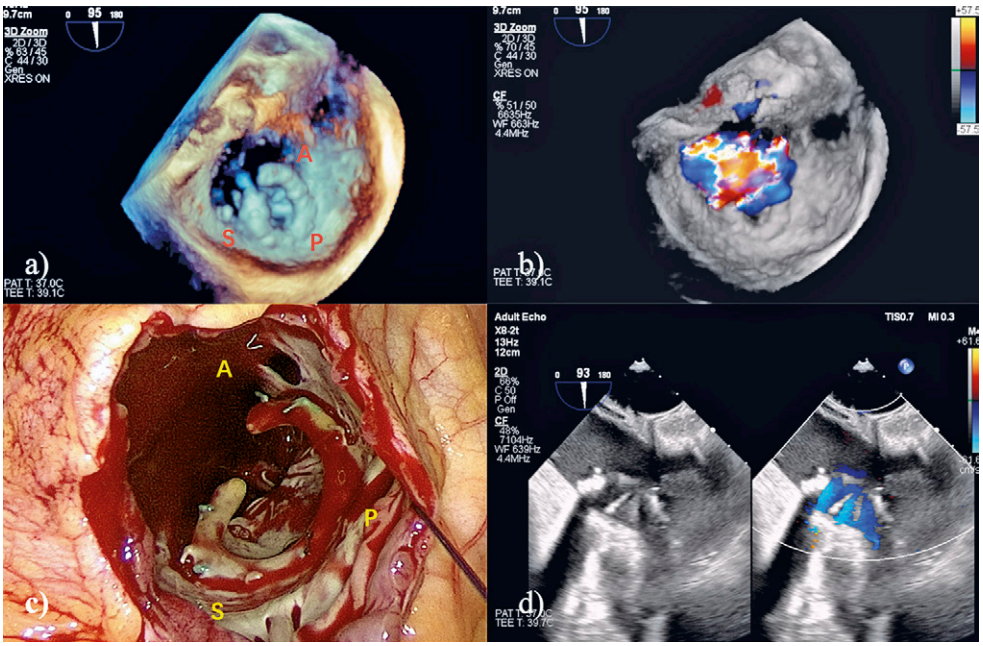

Fig 1. a) Intraoperative real-time 3D TEE showed tricuspid annulus dehiscence; b) the 3D TEE showed that a large amount of tricuspid regurgitation comes from outside the tricuspid annuloplasty ring; c) intraoperative exploration revealed severe tearing of the anterior and septal leaflets of the tricuspid valve, resulting in complete detachment from the tricuspid rigid ring; d) the mechanical tricuspid valve replacement was performed. TEE, transesophageal echocardiography; A, tricuspid anterior leaflet; S, tricuspid septum leaflet; P, tricuspid posterior leaflet.

valvuloplasty. Intraoperative real-time 3D transesophageal echocardiography (TEE) showed tricuspid annulus dehiscence (fig 1a). The 3D TEE view showed that a large amount of tricuspid regurgitation comes from outside the tricuspid annuloplasty ring (fig 1b). The patient underwent thoracoscopic tricuspid valvuloplasty under cardiopulmonary bypass. Intraoperative exploration revealed severe tearing of the anterior and septal leaflets of the tricuspid valve, resulting in complete detachment from the tricuspid rigid ring (fig 1c). Due to severe damage to the tricuspid valve leaflets, tricuspid valvuloplasty was difficult, and mechanical tricuspid valve replacement was performed subsequently (fig 1d). The patient was discharged ten days postoperative uneventfully.

A rare but severe complication of surgical tricuspid valve repair is ring dehiscence, defined as an acute or chronic event in which the sutures anchoring the annuloplasty ring pull out from the annular tissue [1]. When performing tricuspid annuloplasty ring repair, a simple technique with placement of sutures parallel to the annulus is routinely performed. We have speculated that the annuloplasty ring was sutured to the tricuspid leaflets which caused the leaflet tear. Meanwhile, fixation of the annulus to a rigid ring may also result in greater forces on the native annulus than a flexible ring [2]. This is a rare case of severe dehiscence in the tricuspid leaflets after tricuspid rigid ring annuloplasty.

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External snapping hip due to thickened iliotibial tract: dynamic ultrasound examination and ultrasound-guided tenolysis

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To the Editor,

A 42-year-old male presented with an audible snapping sensation during flexion/extension of his right hip, accompanied by intermittent pain over the greater trochanteric area for the last six months. His symptoms were exacerbated by climbing stairs. Despite medication and physical therapy, the discomfort persisted, leading to a referral for ultrasound (US) examination. During initial physical examination, a snapping sound was noted at the posterior lateral hip during hip flexion and extension. Static US imaging revealed a thickened posterior portion of the iliotibial band (ITB). Dynamic US examination, conducted by placing the transducer in short-axis plane on the greater trochanter, showed the thickened ITB snapping over the gluteus medius tendon during repeated hip flexion and extension (fig 1a, Video on the journal site). Superb microvascular imaging indicated mildly increased vascularity in the thickened ITB (fig 1b). No focal thickening or snapping of the ITB was observed on the contralateral side (fig 1c). US-guided hydrodilatation and tenolysis were performed by injecting a mixture 50% dextrose (5 mL) and 1% lidocaine (5 mL) into the thickened ITB (fig 1d, Video on the journal site). His symptoms were found to have improved at the two-week follow-up.

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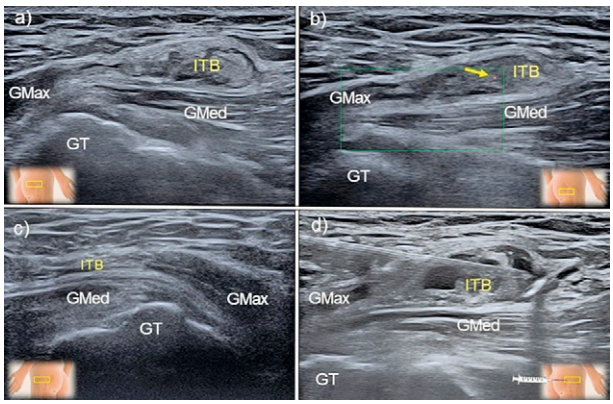

Fig 1. Ultrasound images show the thickened portion of the iliotibial band (a) with mild increased vascularity (arrow) (b), compared to the contralateral normal side (c), and guided tenolysis using 5% dextrose (d). GMax, gluteus maximus; ITB, iliotibial band; GT, greater trochanter; GMed, gluteus medius

Snapping hip syndrome is characterized by an audible/palpable snapping sensation during hip joint movements. It affects 5% to 10% of the general population, with a higher prevalence among young, physically active individuals owing to their greater range of hip motion [1]. There are mainly two types of snapping hip syndrome; external snapping hip (caused by uncoordinated movement between the ITB and the gluteus medius tendon) [2] and internal snapping hip (resulting from abnormal sliding of the iliopsoas tendon against the acetabular rim or intra-articular pathology e.g. loose bodies) [3].

Dynamic US examination is paramount for diagnosing and distinguishing different forms of snapping hip syndrome [4]. In this case, the US findings were consistent with external snapping hip, demonstrating the ITB snapping over the gluteus medius tendon at the greater trochanter. Tenolysis of the ITB with dextrose may help restore its normal fascicular patterns and thickness, while

intratendinous dextrose injections have been beneficial in cases of snapping hip due to gluteus medius tendinopathy [2]. While US imaging and guidance is instrumental in the management of snapping hip syndrome, it is important to address the underlying biomechanical causes to prevent recurrence.

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The retroaortic anomalous coronary artery (RAC) sign – when echocardiography detects coronary artery anomaly

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To the Editor,

A 67-year-old male with a history of arterial hypertension and hyperlipidemia was referred for a cardiology examination due to exercise intolerance. Physical status, laboratory parameters, and electrocardiogram showed no abnormalities. An electrocardiographic stress test revealed excellent functional capacity with no inducible ischemia. Transthoracic echocardiography (TTE) showed a normal heart structure and function; a retroaortic anomalous coronary artery (RAC) sign was detected (fig 1a). Coronary angiography revealed the left circumflex artery (LCx) originating from the right sinus of Valsalva (RSV) from a separate ostium along with the right coronary artery (RCA) and its retroaortic course (fig 1b); the left anterior descending coronary artery (LAD) normally originated from the left sinus of Valsalva (LSV) (fig 1c). There were no signs of obstructive coronary artery disease. Intensive conservative treatment was recommended for the patient.

Coronary artery anomalies (CAA) are found in <1% of the general population [1]. In 60% of cases, CAA affects the LCx, with 69% arising from a separate opening in the right coronary sinus and 31% as a branch of the RCA [1,2]. The course of the abnormal vessel is an important risk modifier. Unlike an interarterial course, which is considered malignant and is often associated with other high-risk anatomic features, subpulmonic, prepulmonic, retroaortic, and retrocardiac courses have not been linked to adverse cardiac events [1]. Therefore, the CAA detected in our patient typically represents a benign anatomic variation.

Although TTE is not the preferred method for diagnosing CAA, echocardiographers should be familiar with the RAC sign and should not overlook it, dismiss it as an artifact, or misinterpret it as calcified valves, normal coronary arteries, or mitral annulus calcification [1,2].

It is crucial to remember that the retroaortic anomalous coronary sign indicates an aberrant origin of the

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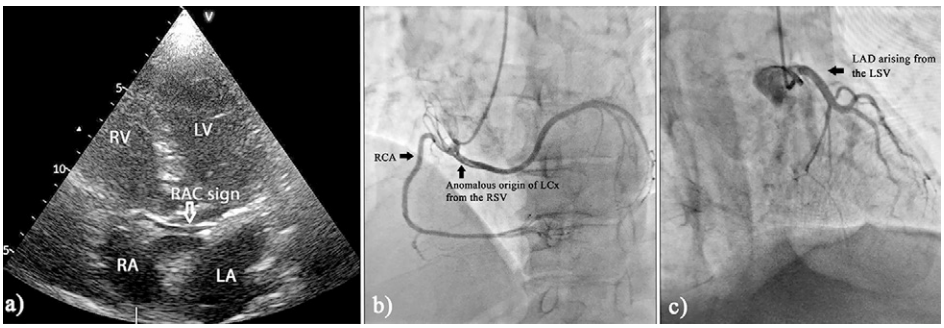

Fig 1. RAC sign – a binary structure above the mitral valve plane into the atrioventricular groove directed toward the right coronary sinus overlapping the aortic root (a); aberrant origin of the LCx from the RSV (b); LAD arising normally from the LSV (c). LA – left atrium, LV – left ventricle, RA – right atrium, RV – right ventricle, RAC – retroaortic anomalous coronary artery sign, LCx – left circumflex artery, RCA – right coronary artery, LAD – left anterior descending artery, RSV – right sinus of Valsalva, LSV – left sinus of Valsalva.

LCx (the most common CAA variant) with a sensitivity of 63.3% and specificity of 93.9% [2]. Additionally, the retroaortic course of the aberrant LCx suggests the likely clinical benignity of echocardiographically identified CAA [1]. Ultimately, computed tomography or invasive coronary angiography is necessary for definitive confirmation and assessment of CAA.

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Ultrasound manifestations of multiple diffuse primary lymphoma in bilateral breasts

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To the Editor,

Ultrasound is the preferred imaging examination tool for breast disease screening. Primary lymphoma of the breast is very rare, and diffuse bilateral involvement is even rarer. As breast lymphoma and breast cancer are treated differently, it is of high clinical value to use imaging tools to identify the two diseases.

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A-55-year-old female was admitted to the Department of Ultrasound because she was found with bilateral breast nodules for 2 weeks. During the ultrasound examination, we found diffuse multiple hypoechoic masses of varying sizes in both breasts, with uneven internal echo (fig 1a) and abundant blood flow signals (fig 1b). The diagnosis was: diffuse multiple hypoechoic masses of bilateral breasts, that are compliant with the Breast Imaging Reporting and Data System (BI-RADS) for Class 4B (considering lymphoma). In addition, the patient also underwent examinations including mammography and magnetic resonance imaging (MRI) (fig 1c,d).

The patient subsequently performed a fine-needle aspiration of both breasts, which revealed lymphoma cells. Immunohistochemical staining: CD3(-), CD20(+), CD34(-), CD21(-), Ki-67(about 90%+), CD5(-), CD23(-),

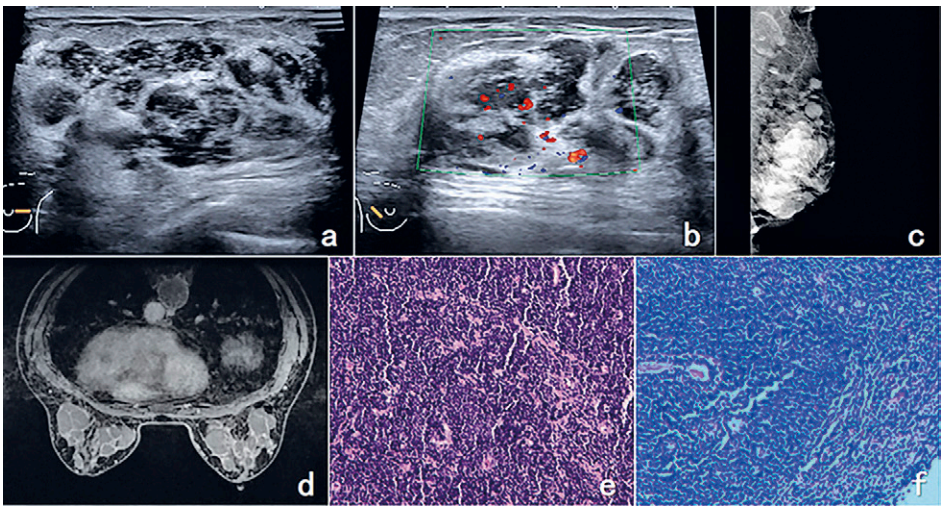

Fig 1. a) Grayscale ultrasound images showed multiple irregular, hypoechoic masses in the left breast; b) color Doppler showed abundant blood flow signals within the hypoechoic mass of the right breast; c) mammography showed multiple high-density masses in the right breast; d) MRI showed multiple round and oval lumpy abnormal signal shadows in both breasts; e and f) Hematoxylin-eosin staining showed proliferating lymphocytes (Hematoxylin and eosin stain×200).

Cyclin D1(-), CD79α(+), PAX-5(+), TdT(-), CD10(+), Bcl-6(+), CD43(+), Supplementary immunohistochemical staining: CKpan(Epithelium +), Bcl-2(+), c-MYC(-), MUM1(90%+), CD38(+), LMO2(-). Molecular pathogenetic: EBER(-). these was consistent with the features of high-grade B-cell lymphoma, NOS (fig 1e,f). The patient was then transferred to the Hematology Department for treatment.

Primary breast lymphoma (PBL) is very rare, with a prevalence from 0.05% to 0.53% of breast malignancies [1]. Almost all PBL is derived from B cells and diffuse large B-cell lymphoma is the most common subtype [2]. Painless breast masses are a common clinical presentation of BL. It mostly occurs in women aged 50~60 [3]. Most breast cancers need surgical resection; however, chemotherapy and radiotherapy are the main treatments for PBL. Therefore, the differential diagnosis of preoperative imaging is very important. Breast malignant tumors usually present as irregular hypoechoic, non-parallel, calcifications and burrs may be seen, vocal halos or “crab foot-like” changes may be also seen around the periphery. The ultrasound aspect of PBL is different from the other breast malignant tumors: the mammary area is dominated by hypoechoic masses with flaky hyperechoic, acoustic enhancement, hypervascularization, soft texture on shear wave elastography, and uniform internal perfusion on contrast-enhanced ultrasound. Most cases are accompanied by abnormal lymph nodes in adjacent areas. Finally, the definite diagnosis should be based on pathological examination.

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Ultrasound evaluation of a vascular malformation in the external jugular vein: worsening swelling and pain in the supine position

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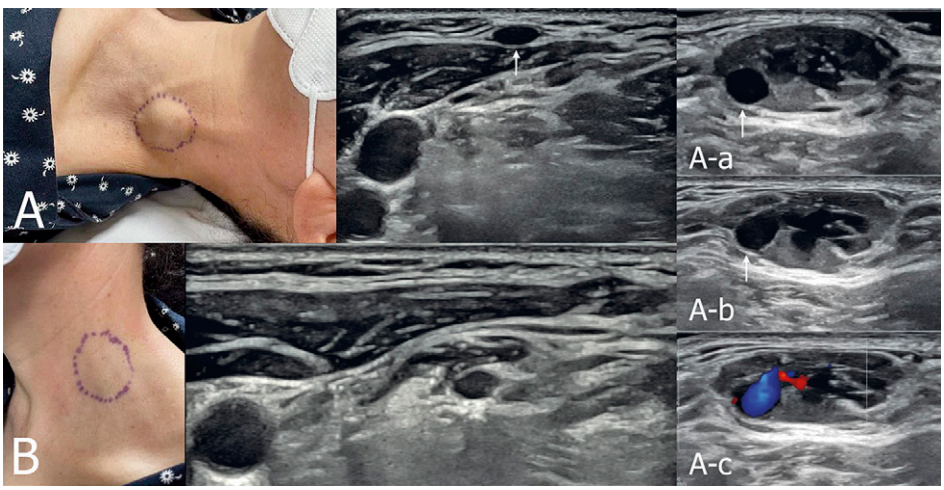

Fig 1. Ultrasound images of the venous malformation: (A) In the supine position, the lesion is visible with multiple cystic components; (B) In the erect position, the lesion disappears, demonstrating resolution due to positional changes. The arrows indicate the external jugular vein.

To the Editor,

We present a rare case of venous malformation (VM) localized to the external jugular vein (EJV), highlighting its dynamic behavior and the critical role of ultrasound (US) in its diagnosis. A 59-year-old female presented with a soft, non-tender neck swelling that worsened in the supine position and diminished when upright. The patient experienced moderate-to-severe pain associated with the mass, which intensified during prolonged supine positioning. US in the supine position revealed a 20×8×35 mm heterogeneously hypoechoic, compressible mass with small cystic components in the subcutaneous fat layer of the anterior lower neck (fig 1A). Doppler US confirmed venous pooling with sluggish, non-pulsatile flow, which supported the diagnosis of VM. The mass was no longer visible in the upright position, indicating the positional nature (fig 1B), and the patient's pain was managed with oral pregabalin. No invasive procedures were required because of the absence of malignant features and symptom improvement with positional changes. The patient was advised to undergo periodic follow-ups to monitor the progression of the lesion. VMs are typically caused by errors in venous network development that lead to dilated venous channels, owing to smooth muscle cell deficiency [1]. VMs that involve the EJV are particularly rare, which makes this case report notable [2]. The dynamic behavior of the lesion, which resolved in the upright position, emphasizes the need to consider vascular malformations in the differential diagnosis of neck masses, even in uncommon locations such as the EJV. Static imaging modalities, such as CT or MRI, have limitations in capturing functional changes associated with positional variations. In contrast, dynamic US is

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highly beneficial for identifying such changes and is the preferred imaging modality when positional variations are suspected. In this patient, dynamic US not only allowed visualization of the structural characteristics of the lesion but also captured its real-time behavior, including size fluctuation and vascular flow changes. VMs appear as anechoic or hypoechoic structures with mixed echogenicity and low, slow blood flow that increases with Valsalva maneuvers or compression-decompression on ultrasound [3]. This case report illustrates the critical role of dynamic ultrasound in the diagnosis of VMs, particularly when positional variability is a defining feature.

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Non-mass-like breast intraductal carcinoma detected by Micro-Flow imaging and elastography

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To the Editor,

A 41-year-old woman accidentally found a stiffed lump in her left breast, which was evaluated as BI-RADS 4a on ultrasound (US) in another center. She came to our hospital for further evaluation and an US examination was redone. During the examination, the lesion located at the upper lateral quadrant in the left breast showed duct-ectasia, blurred margin and non-mass like shape (fig 1a), which was difficult to be categorized according to BI-RADS. For more information, the Micro-Flow imaging combined with elastography were applied. It was found that the penetrating vessel distributed along the stiffed lesion area outlined by elastography (fig 1b,c). In the meantime, suspicious ipsilateral axillary lymph nodes with thickened cortex were observed. The MFI showed distinct complex vascular pattern which highly predicted metastasis according to Du et al [1] (fig 1d). Thus, an upgraded classification of BI-RDAS 4c was assigned. The patient received surgery soon and the pathology re-

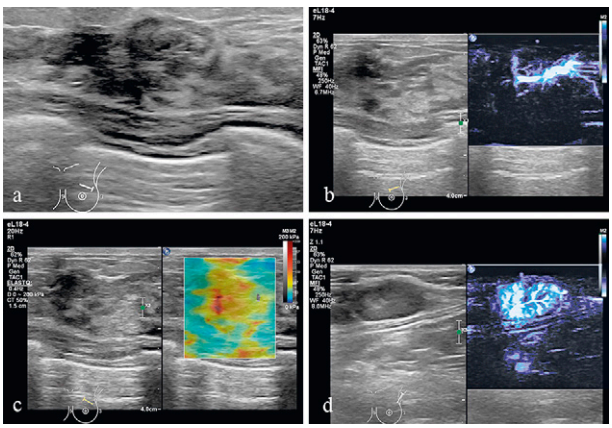

Fig 1. a) A 41-year-old female with a non-mass like lesion locating at the left breast, which proved to be intraductal carcinoma after surgery. B-mode ultrasound showing architectural distortion region with abnormal ductal change at the upper outer quadrant of the left breast; b) A penetrating vessel with multiple uneven branches inside the lesion was displayed by Micro-Flow imaging technique: c) Shear wave elastography showing higher stiffness in the distorted region compared with adjacent tissues; d) Micro-Flow imaging showing complicated and increased vascularity rather than simple hilar flow in a suspicious axillary lymph node.

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vealed breast intraductal carcinoma of the non-mass like lesion.

Choi et al. reported in 2016 that the combination of elastography and Doppler ultrasound gained no more diagnostic accuracy than elastography alone (84.5% VS 84.5%) [2]. Nevertheless, contrast-enhanced ultrasound (CEUS), a technique demonstrating the micro-perfusion of a lesion, was proved to be useful in diagnosing NMLs indicated by several researches. Zhang et al. presented that CEUS showed a higher specificity in differentiating malignant NMLs from its benign counterparts than BI-RADS (74.6% VS 30.2%) [3]. Zhang et al. also reported that CEUS +US +strain elastography for evaluating the malignant NMLs achieved the sensitivity and specificity rates of 95.0% and 77.4%, which was better than other groups [4]. These findings show that the vascularity information is as essential as elasticity but may be displayed not that well on conventional Color Doppler ultrasound mode.

In our experience, we applied the Micro-Flow imaging (MFI) method to better indicate the cancer risk of a non-mass lesion on US. MFI, an imaging method combining flash replenishment imaging and maximum intensity holding, is good at showing blood flows at low speeds. It is non-invasive compared with CEUS and is more sensitive than Doppler ultrasound. MFI combined with elastography elevated our diagnostic confidence in this case. It is believed that such method could be regularly used in clinical practice and bring more benefits.

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