Fig. (4). Transabdominal US and axial CT images at the Level of the superior mesenteric artery demonstrating intimal flap.

maintain a high index of suspicion in establishing the diagnosis.

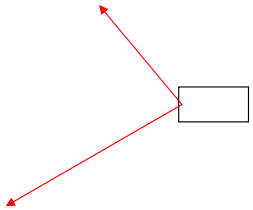

Fig. (5). Sagittal reconstruction of CT images demonstrating intimal flap.

Physical examination for either confirming or ruling out aortic dissection is unreliable. Radiologic imaging, however, is highly sensitive and specific. Computed tomography (CT), magnetic resonance imaging (MRI), angiography, and transesophageal echocardiography (TEE) represent the most commonly utilized and most sensitive diagnostic studies [5].

Acute aortic dissection is frequently fatal, with the mortality rate approaching 1% per hour during the first 48 hours [9]. If it remains unrecognized and untreated, aortic dissection results in 90% mortality within the first 3 months, usually due to acute aortic insufficiency, major branch vessel occlusion, or rupture [10]. Expeditious diagnosis is obviously critically important.

Angiography has historically been the most widely used diagnostic modality and is often preferred by surgeons prior to repair. It can differentiate the true and false lumen, identify entry and re-entry sites, demonstrate the anatomy of the major arterial branches, and detect aortic regurgitation. However, angiography is an invasive procedure, utilizes potentially nephrotoxic contrast, and requires time for setup and performance [11]. CT and MRI are also excellent diagnostic options, with sensitivities of 93-100% and 95-100%, respectively [10, 12]. However, both tests usually require transporting an unstable or potentially unstable patient away from the more controlled emergency department environment. MRI, in particular, may be difficult to obtain after hours and in an emergent setting.

Clinicians are increasingly using ultrasound to diagnose and exclude life-threatening pathology in real time. The use of ultrasound in the diagnosis of abdominal aortic aneurysm is common and highly sensitive [13-15]. However, the clinician should be familiar with other diagnoses that may be made or suggested during bedside sonographic evaluations. Though TAS is less sensitive (<80%) for the diagnosis of acute aortic dissection than the other more commonly used modalities such as CT, clues to the diagnosis are often present [16-26]. Numerous reports of using TAS in combination with transthoracic echocardiography to diagnose acute aortic dissection exist in the literature [24]. In certain cases, such as the one presented, the diagnosis of dissection can be made or strongly suggested on the basis of TAS alone.

The clinician sonographer must be aware of the sonographic features of acute dissection including the presence of echogenic intimal flaps, a dilated aortic root, and a thickened aortic wall. Discovery of the classically described intimal flap using TAS is pathognomonic for aortic dissection. The intimal flap occurs when blood dissects between the walls of the aorta due to a tear in the innermost layer of the aorta, the intima. This intimal layer can be seen as a thin echogenic linear structure within the aorta and often moves freely with arterial pulsations. This flap can be easily missed or may be mistaken for a sonographic artifact within the aortic lumen. If the membrane is thick or the lumen is thrombosed, the membrane may not move. The aortic lumen may be dilated, but may not be truly aneurysmal. Further, thrombosis of the iliac, celiac, and superior mesenteric arteries may be present and contribute to confusion.

Determining the extent of the dissection is paramount in the management of an aortic dissection. Dissections involving ascending aorta (Stanford Type A) are associated with a high incidence of mortality due to associated obstruction of vasculature supplying the head, neck, and heart. In addition, ascending arch dissections may extend retrograde and rupture into the pericardium, resulting in immediate tamponade. Dissections limited to the descending aorta (Stanford Type B) may impede blood flow to the mesenteric arteries, renal arteries, spinal cord, lower extremities, etc., and are usually managed non-operatively.

As bedside US becomes more widespread, clinician sonographers are certain to encounter unexpected pathology and must become aware of an ever increasing array of important findings. As illustrated by the case presented, potentially life-threatening processes may be incidentally encountered during scans performed for more common maladies.

CASE PRESENTATION

A 30 year old female was brought to the emergency department for evaluation of abdominal pain and vaginal bleeding. Her vital signs were unremarkable except for a slightly elevated heart rate of 110. Physical examination revealed mild lower abdominal tenderness to palpation, a small amount of blood in the vaginal vault, and a closed cervical os. Her qualitative urine pregnancy test was positive and her quantitative B-hcg was 133975 mIU/ml. Bedside transvaginal ultrasound was performed (Figs. **6** and **7**).

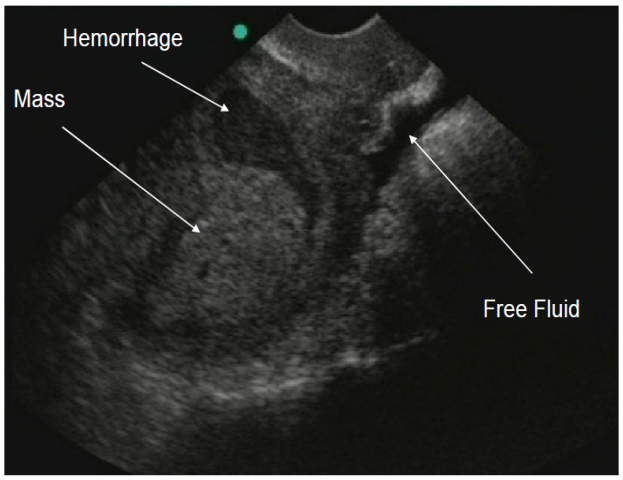

Fig. (6). Long axis view showing intrauterine mass, adjacent hemorrhage, and free fluid.

DISCUSSION

The transvaginal ultrasound images are consistent with a molar pregnancy. The classic clinical findings associated with molar pregnancy include uterine enlargement, vaginal bleeding, hyperemesis, and elevated B-HCG [26]. The uterine enlargement and magnitude of B-hcg elevation are often more than would be expected given the gestational age. The diagnosis is suspected based on clinical grounds and imaging, but is confirmed by histologic analysis. The classic sonographic appearance of a molar pregnancy is an intrauterine heterogeneous mass with internal hypoechoic regions, previously described as a “snowstorm”.

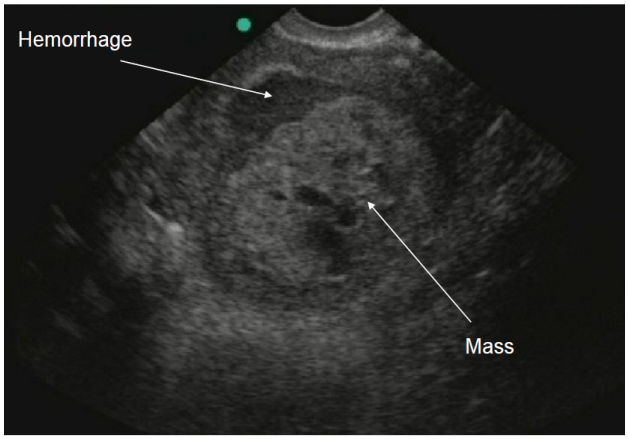

Fig. (7). Short axis view showing intrauterine mass and adjacent hemorrhage.

The patient subsequently underwent suction curretage, with pathology confirming the diagnosis of molar pregnancy. Serial B-HCG levels were monitored postoperatively and were falling appropriately. Malignant gestational trophoblastic disease should be suspected if serum B-hcg levels fail to normalize after uterine evacuation [27].

CONCLUSIONS

These cases represent unusual findings for the clinician sonographer. While unusual, the sonographer must have knowledge of rare clinical entities. Ultrasound is an excellent modality for detecting free abdominal fluid, but cannot distinguish blood from peritoneal fluid or where the blood is emanating from. Ultrasound is also very useful in the diagnosis of molar pregnancy. While rare, the appearance on ultrasound is characteristic. While not the modality of choice, transabdominal and transthoracic ultrasound may give an indication to the presence of aortic dissection. A flap in the aorta is highly specific for a vascular dissection.

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REFERENCES

[1] Von FFT. Uber den diabetes. Berlin: Hirschwald 1884.
[2] Menghini G. One-second biopsy of the liver - Problems of its clinical application. Gastroenterology 1958; 35: 190-9.
[3] Menghini G. One-second biopsy of the liver - Problems of its clinical application. Gastroenterology 1958; 35: 190-9.
[4] Grant A, Neuberger J. Guidelines on the use of liver biopsy in clinical practice. Gut 1999; 45(IV): IV1-IV11.
[5] Terjung B, Lemnitzer I, Dumoulin FL, *et al.* Bleeding complications after percutaneous liver biopsy. Digestion 2003; 67: 138-45.
[6] Khan IA. Clinical, diagnostic, and management perspectives of aortic dissection. Chest 2002; 122(1): 311-28.
[7] Spittell PC, Spittell JA Jr, Joyce JW, *et al.* Clinical features and differential diagnosis of aortic dissection: experience with 236 cases (1980 through 1990). Mayo Clin Proc 1993; 68: 642-51.
[8] Bickerstaff LK, Pairolero PC, Hollier LH, *et al.* Thoracic aortic aneurysms: a population-based study. Surgery 1982; 92: 1103-8.
[9] Eisenberg MJ, Rice SA, Paraschos A, *et al.* The clinical spectrum of patients with aneurysms of the ascending aorta. Am Heart J 1993; 125:1380-5.
[10] Hirst AE, Johns VJ, Kime SW. Dissecting aneurysms of the aorta: a review of 505 cases. Medicine 1958; 37: 217-79.

[11] Olin J, Fuster V. Acute Aortic Dissection: The need for rapid, accurate, and readily available diagnostic strategies. Arterioscler Thromb Vasc Biol 2003; 23(10): 1721-3.
[12] Chandrasekaran K, Currie PJ. Transesophageal echocardiography in aortic dissection. J Invasive Cardiol 1989; 1: 328.
[13] Kahn I, Nair C. Clinical, Diagnostic, and management perspectives of aortic dissection. Chest 2002; 122(1): 311-28.
[14] Kuhn M, Bonnin RL, Davey MJ, *et al.* Emergency department ultrasound scanning for abdominal aortic aneurysm: accessible, accurate, and advantageous. Ann Emerg Med 2000; 36: 219-23.
[15] Tayal V, Graf C, Gibbs M. Prospective study of accuracy and outcome of emergency ultrasound for abdominal aortic aneurysm over 2 years. Acad Emerg Med 2003; 10: 867-71.
[16] Costantino TG, Bruno EC, Handly N, *et al.* Accuracy of emergency medicine ultrasound in the evaluation of abdominal aortic aneurysm. J Emer Med 2005; 29: 455-60.
[17] Granato JE, Dee P, Gibson RS. Utility of two-dimensional echocardiography in suspected ascending aortic dissection. Am J Cardiol 1985; 56:123-9.
[18] Kasper W, Meinetz T, Kersting F, *et al*. Diagnosis of dissecting aortic aneurysm with suprasternal echocardiography. Am J Cardiol 1978; 42: 291-4.
[19] Victor MF, Mintz GS, Kotler MN, *et al.* Two-dimensional echocardiographic diagnosis of aortic dissection. Am J Cardiol 1981; 48: 1155-9.
[20] Erbel R, Daniel W, Visser C, *et al.* Echocardiography in diagnosis of aortic dissection. Lancet 1989; 330: 457-60.
[21] Khandheria BK, Tajik AJ, Taylor CL, *et al*. Aortic dissection: review of value and limitations of two-dimensional echocardiography in a 6 year experience. J Am Soc Echocardiogr 1989; 2: 17-24.
[22] Thomas EA, Dubbins PA. Duplex ultrasound of the abdominal aorta - a neglected tool in aortic dissection. Clin Radiol 1990; 42: 330-4.
[23] Victor MF, Mintz GS, Kolter MN, *et al.* 2 dimensional echocardiographic diagnosis of aortic dissection. Am J Cardiol 1981; 48: 1155-9.
[24] Roundaut RP, Billes MA, Gosse P, *et al*. Accuracy of m-mode 2 dimensional echocardiography in the diagnosis of aortic dissection: an experience with 128 cases. Clin Cardiol 1988; 11: 553-62.
[25] Fojtik JP, Costantino TG, Dean AJ. the diagnosis of aortic dissection by emergency medicine ultrasound. J Emer Med 2007; 32(2): 191-6.
[26] Garner E, Goldstein D, Feltmate C, *et al*. gestational trophobastic disease. clin obstet gynecol 2007; 50(1): 112-22.
[27] Kohorn EI. The New FIGO 2000 staging and scoring system for gestational trophoblastic disease: Description and critical assessment. Int J Gynecol Cancer 2001; 11(1): 73-7.

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