A pitfall in the echographic diagnosis of abdominal aortic aneurysm: when para-aortic lymph nodes are the trick

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Abstract

The abdominal aortic aneurysm (AAA) is a potentially fatal asymptomatic disease. It progresses silently with clinical complications that, when they occur, constitute a very serious event, frequently resulting in the patient's exitus. As a result, early detection and treatment are critical because the right therapeutic strategy can halt the disease's natural progression. AAA is frequently discovered as an incidental finding during an abdominal ultrasound or a plain X-ray of the abdomen, which is required for other pathologies. The primary diagnostic tool for AAA identification is abdominal B-mode ultrasound. It is cheap, widely available, non-invasive, and has high diagnostic sensitivity. However, this diagnostic tool may fail in rare cases due to misleading anatomical findings. We present an unusual flaw in the echographic AAA evaluation that should be considered during the diagnostic work-up.

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Introduction

Abdominal aortic aneurysm (AAA) is a degenerative process, predominantly of the atherosclerotic type, that involves all layers of the aortic wall [1]. It is defined as a dilation of the arterial vessel with an anteroposterior or transverse diameter of ≥3 cm involving all the layers of the arterial wall, unlike other pathologies such as dissection and pseudoaneurysm [2]. AAA natural history is characterized by the progressive expansion of a variable rate, usually asymptomatic. It might remain stable for years [3]. AAA prevalence differs in epidemiological studies according to the type and age of the population evaluated [4], and it is estimated between 2 and 8% in the general population [5]. AAA shares risk factors with atherosclerotic vascular disease, with tobacco use being the modifiable risk factor strongly associated (up to 8-fold) with its development [6]. Screening for AAA should be considered in subjects ≥65 years old with a single ultrasound scan, according to the latest European Society for Vascular Surgery guidelines [7]. Because a physical examination has low sensitivity in the detection of small AAA, ultrasound imaging is recommended for screening purposes, first-line diagnosis, and follow-up [2,7], with a reported sensitivity and specificity of up to 100% in AAA >3 cm [8]. However, some errors and pitfalls might occur in the acquisition and interpretation of ultrasound imaging of the abdominal aorta, such as measurement errors and variations in technique, misdiagnosis errors, difficulty with visualization of the aorta, and a wide range of sonographer experience [9]. A computed tomography (CT) scan is indicated as a second-line imaging technique for therapeutic decision-making and treatment planning [10]. Here we report an unusual pitfall in echographic AAA evaluation with an important differential diagnosis that should be considered by sonographers and clinicians as a possible confounding factor.

Case Report

A 65-year-old woman with a medical history of Hashimoto's thyroiditis, smoking habit, hypertension, hypercholesterolaemia, and diabetes mellitus (>10 years) was referred to our cardiology unit for a scheduled coronary angiography (CA). The indication for CA was made during the preoperative evaluation of the patient for worsening dyspnea and asthenia in the last few months, associated with atypical chest pain. An echographic AAA diagnosis was previously made, and the patient was already scheduled for surgery (Figures 1 and 2). Because of the reported symptoms and the very high cardiovascular risk, based on the previous AAA diagnosis, the exclusion of coronary artery disease was deemed appropriate. The basal electrocardiogram showed a normal sinus rhythm with signs of left ventricular hypertrophy. The transthoracic echocardiogram presented mild mitral regurgitation and increased septal thickness, non-dilated right and left ventricles and atria, no regional wall abnormalities, and normal left ventricle systolic function.

At admission, the temperature was 36.3°C, the heart rate was 83 beats/min, the blood pressure was 138/81 mm Hg, and the respiratory rate was 14 breaths/min. The lung examination showed no alterations. The heart assessment showed no murmur or rub. However, an enlargement of the cervical and inguinal lymph nodes was observed at the systemic physical examination. On suspicion of a malignancy, a contrast-enhanced CT scan was scheduled, showing an increase in para-aortic, inguinal, cervical, and axillary lymph nodes in the absence of AAA (Figure 3).

Routine blood tests revealed moderate leukocytosis (up to 29,180/μL) and mild normocytic anemia (up to 11.5 g/dL, with normal mean corpuscular volume). Platelets were within the normal range. Inflammatory markers, such as C-reactive protein, were within the normal range. Taken together the imaging evaluation and the blood test results, a hematological consultation was requested with subsequent indication to a peripheral smear, reporting a spectrum of maturation within the myeloid cells, including immature forms (blast), mid-stage myeloids, and late-stage myeloids (neutrophils and band forms). These features were typical of chronic myeloid leukemia (CML). The patient was then referred to hematologists for therapeutic work-up.

Discussion

The National Cholesterol Education Program Adult Treatment Panel III guidelines have indicated for the first time that AAA is among the conditions of equivalent cardiovascular risk [11]. This means that a patient with AAA of any size has a risk of major cardiovascular events >20% at 10 years, plus the risk of aneurysm rupture. This high event risk is the consequence of a high probability that there is associated coronary and vascular disease [12], often asymptomatic. Unfortunately, AAA patients are still underdiagnosed and undertreated [13]. It is estimated that in Europe, over 700,000 people are affected by this disease, with an annual incidence of about 220,000 new cases, thus making it a common disease [2,4,7]. AAA rupture is associated with up to 80% of prehospital mortality and up to 50% of perioperative mortality. The risk of spontaneous AAA rupture correlates directly to the maximum diameter. The annual risk of AAA rupture with a diameter between 5 and 6 cm is 1% in males and 4% in females. For AAA ≥6 cm, the risk is about 14% in men and 22% in women [7]. If an early diagnosis is made, a preventive approach may be indicated with a significant mortality reduction [2,7,14].

However, diagnosis is often difficult because, in most cases, subjects are asymptomatic, with poor physical findings and typical clinical signs affected by variable sensitivity. The importance of diagnosing AAA has been discussed above. It is also important to correctly diagnose a malignancy as the CML to start the appropriate therapy as soon as possible [15]. The ultrasound evaluation is the method of choice for AAA screening in light of its high sensitivity

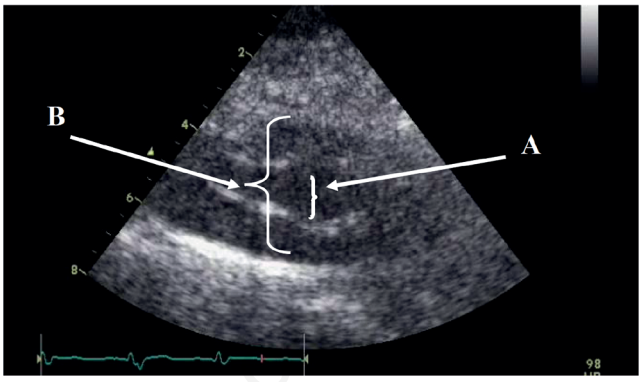

Figure 1. Echo image, B mode, long axis of abdominal aorta showing the true aortic lumen (A) and the false lumen (B).

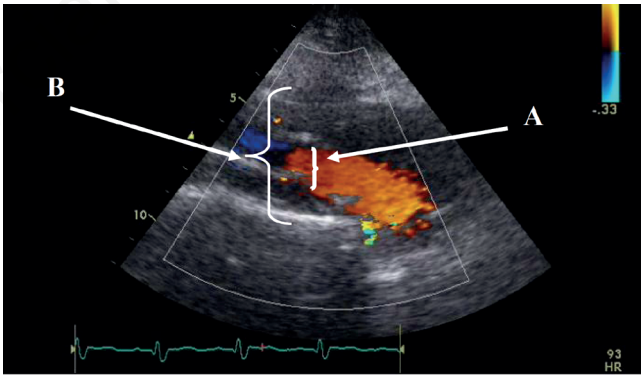

Figure 2. Echo-color Doppler image, B mode, long axis of true lumen (A, visible color flow) and false lumen (B, no flow).

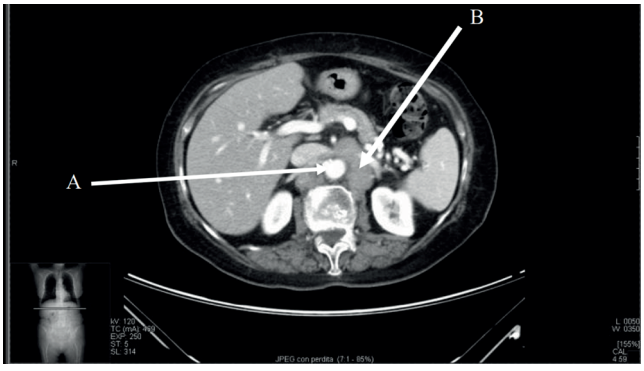

Figure 3. Abdomen computed tomography scan image showing a normal size aorta (A) and enlarged para-aortic lymphnodes (B).

(95%), specificity (close to 100%), low cost, and absence of radiation. However, examination accuracy in the measurement of the aneurysmatic diameters (anterior-posterior and transverse) can be affected by obesity and a high degree of meteorism. For this reason, appropriate patient preparation (fasting and possibly the use of antimeteorics) is mandatory. Of the same importance is a standard execution technique to reduce the sonographer-dependent variability. However, as reported in our case, there are a few situations where a pitfall may occur, such as para-aortic lymph nodes. Hypodense and/or small lymph nodes might be missed [16], thus contrast-enhanced CT scans become the gold standard tool to complete the ultrasound investigation, providing a better assessment of the AAA morphology that is mandatory for therapeutic approaches [8].

Conclusions

Given the high AAA prevalence, which is often asymptomatic, and the high mortality related to its major complication, the rupture, an early diagnosis is essential. Ultrasound evaluation is the primary approach. However, the imaging techniques may fail to produce the appropriate diagnosis because of some pitfalls that could lead to a misleading diagnosis. They should only be part of a complete approach to the patient that has to start with the physical examination, which often becomes a lost art [17]. Poor physical exam skills might lead to incorrect or even missed diagnoses, thus causing delays in the life-saving treatments of time-sensitive diseases. The reported case clearly indicates that "we should shut our eyes and use our hands to look over".

References

1. Tan KHM, Salim S, Machin M, et al. Abdominal aortic aneurysm clinical practice guidelines: a methodological assessment using the AGREE II instrument. BMJ Open 2022;12: e056750.
2. Dalman RL. The 2019 update of the European abdominal aortic aneurysm guidelines. J Vasc Surg 2019;69:633-4.
3. Gao JP, Guo W. Mechanisms of abdominal aortic aneurysm progression: a review. Vasc Med 2022;27:88-96.
4. Zommorodi S, Leander K, Roy J, et al. Understanding abdominal aortic aneurysm epidemiology: socioeconomic position affects outcome. J Epidemiol Commun Health 2018;72:904-10.
5. Kent KC, Zwolak RM, Egorova NN, et al. Analysis of risk factors for abdominal aortic aneurysm in a cohort of more than 3 million individuals. J Vasc Surg 2010;52:539-48.
6. Stackelberg O, Wolk A, Eliasson K, et al. Lifestyle and risk of screening-detected abdominal aortic aneurysm in men. J Am Heart Assoc 2017;6:e004725.
7. Wanhainen A, Verzini F, Van Herzeele I, et al. Editor's choice - European society for vascular surgery (ESVS) 2019 clinical practice guidelines on the management of abdominal aorto-iliac artery aneurysms. Eur J Vasc Endovasc Surg 2019;57:8-93.
8. Iwakoshi S, Hirai T, Kichikawa K. Updates on ultrasonography imaging in abdominal aortic aneurysm. Ann Vasc Dis 2019;12: 319-22.
9. Lema P, Kim J, St. James E. Overview of common errors and pitfalls to avoid in the acquisition and interpretation of ultrasound imaging of the abdominal aorta. J Vasc Diagn Interv 2017;5:41-6.
10. Hong H, Yang Y, Liu B, Cai W. Imaging of abdominal aortic aneurysm: the present and the future. Curr Vasc Pharmacol 2010;8:808-19.
11. Talwalkar PG, Sreenivas CG, Gulati A, Baxi H. Journey in guidelines for lipid management: from adult treatment panel (ATP)-I to ATP-III and what to expect in ATP-IV. Indian J Endocrinol Metab 2013;17:628-35.
12. Marsico F, Giugliano G, Ruggiero D, et al. Prevalence and severity of asymptomatic coronary and carotid artery disease in patients with abdominal aortic aneurysm. Angiology 2015;66: 360-4.
13. Natale F, Capasso R, Casalino A, et al. Peripheral artery disease and abdominal aortic aneurysm: the forgotten diseases in COVID-19 pandemic. Results from an observational study on real-world management. Medicina 2021;57:672.
14. Wu H, Zhang L, Li M, et al. Systematic review and meta-analysis of published studies on endovascular repair of abdominal aortic aneurysm with the p-branch. Front Surg 2022;9:879682.
15. Radivoyevitch T, Weaver D, Hobbs B, et al. Do persons with chronic myeloid leukaemia have normal or near normal survival? Leukemia 2020;34:333-5.
16. Harisinghani MG. Pitfalls and mimics of lymph nodes on imaging. In: Harisinghani MG, ed. Atlas of lymph node anatomy. New York: Springer; 2013. pp 155-77.
17. Asif T, Mohiuddin A, Hasan B, Pauly RR. Importance of thorough physical examination: a lost art. Cureus 2017;9:e1212.