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RAPID COMMUNICATION

Anatomic and clinical rationale of the V-sign to detect accessory axillary breast tissue

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Vijay Naraynsingh
Shamir O Cawich
Ravi Maharaj
Dilip Dan
Dale Hassranah

Department of Clinical Surgical Sciences, University of the West Indies, St Augustine Campus, Trinidad and Tobago, West Indies

Abstract: The potential for breast cancer to present with lymphatic metastases, has instilled anxiety when women present with axillary masses. We discuss a simple and reliable clinical sign that can help clinicians to distinguish between axillary nodal metastases and accessory axillary breast tissue. Awareness and recognition of the "V-sign" can allay anxiety in women with accessary axillary breast tissue and prevent costly investigations in most cases.

Keywords: axilla, cancer, axillary nodal metastases, lymphadenopathy, skin-folding

Introduction

Perhaps the major concern in a woman presenting with an axillary mass is the consideration of axillary lymphadenopathy, possibly due to lymphatic metastases from primary breast cancer. However, these masses may also represent accessory axillary breast tissue (AABT).

Although it is a benign and usually asymptomatic condition, the presence of AABT may be a source of anxiety for these women.[1,2] Apart from the mental morbidity, the inability to differentiate between the two differential diagnoses can lead to costly, invasive investigations.[2] Therefore, it is important for clinicians to be able to identify AABT and distinguish it from more sinister differentials. We believe that this can be achieved through a simple but effective clinical sign. Here, we discuss the clinical and anatomic rationale for the "V-sign."

Developmental anatomy of the breast

The breasts develop from the mammary ridges that extend from the axilla to the inguinal region. These mammary ridges appear in the fifth or sixth week of human embryonic development and rapidly regress to leave a small pectoral remnant.[3] When there is failure of normal regression of the mammary ridges, AABT (polymastia) and/or accessory nipples (polythelia) result.[3]

The breast develops when an ingrowth of ectoderm forms a primary tissue bud in the mesenchyme and then divides into 15–20 secondary buds. Epithelial cords develop from the secondary buds, extend into the surrounding mesenchyme and eventually form the ductal systems.[3] Therefore, from an anatomic point of view, the breast develops in subcutaneous tissue in a plane superficial to the deep fascia, whether this occurs in the axilla or in the pectoral region.

Some efferent lymphatics from the breast drain medially toward the perforating branches of the internal mammary artery to enter the internal mammary group of nodes.[4]

Correspondence: Shamir O Cawich
Department of Clinical Surgical Sciences, University of the West Indies, St Augustine Campus, Trinidad and Tobago, West Indies
Tel +1 876 315 7414
Fax +1 876 620 4560
Email socawich@hotmail.com

The majority of the efferent lymphatic vessels drain from superficial to deep, eventually piercing the clavipectoral fascia to drain into axillary nodal groups.[4] The axillary nodal groups are located deep to the fascia in relation to the axillary artery and pectoralis minor muscle.

Rationale for the V-sign

In its normal situation, the breast is superficial to the pectoralis major fascia. Although the axillary tail of Spence extends beyond the lateral border of the pectoralis major, it remains superficial to the suspensory ligament of the axilla (SLA), which is the extension of the clavipectoral fascia into the axilla. Therefore AABT is also superficial to the SLA. In contrast, axillary lymph nodes and any metastatic deposits contained within them are located in the axilla deep to the clavipectoral fascia.

The relationship to the fascia is important. Any accumulation of excess subcutaneous tissue superficial to a fascial layer will produce folding of the skin. This tendency of excess subcutaneous tissue to "fold" is seen in obese patients who develop generalized skin folds (Figure 1). These folds are also seen in other conditions that increase the bulk of subcutaneous tissue such as lymphedema (elephantiasis) and severe pretibial myxedema. Similarly, the presence of AABT produces folding of the skin when the arm is held at the side – the V-sign. In normal individuals without excess subcutaneous fat/AABT, the axillary fold appears as a single line with the arm in full adduction (Figure 2). The V-sign refers to the appearance of two lines in the shape of a "V" in the anterior axillary fold as demonstrated in Figures 3–5. The V-sign will be present even when skin changes are present as in scleroderma – once there is substantial increase

Figure 1 Skin-folding in the limbs of an obese male.

Figure 2 A patient with invasive ductal carcinoma of the upper outer quadrant of the right breast. This patient has a normal axilla, without the V-sign present. The axillary fold in this patient appears as a single line.

Figure 3 The axilla of a patient with accessory axillary breast tissue. There is folding of axillary skin to produce the V-sign.

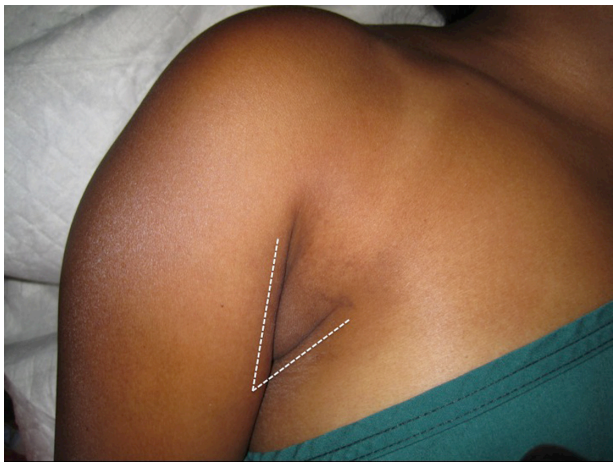

Figure 4 A dotted white line has been superimposed on the photograph of the patient's axilla to demonstrate the skin folding in the shape of a "V" to produce the V-sign.

Figure 5 The axillae of a patient with accessory axillary breast tissue. There is bilateral folding of axillary skin to produce the V-sign.

in the subcutaneous tissue. Because AABT is always present in the subcutaneous tissue above the fascial plane, changes in the skin will not affect the folding. A similar phenomenon occurs when the thickened skin forms folds in elephantiasis.

In contrast, the expansion of deeper masses is restricted by fascia, resulting in stretching of the fascia, subcutaneous layer, and overlying skin. The stretching effect can be seen with any sub-fascial masses such as pregnancy, ascites and tumors in the abdomen (Figure 6). Consequently, the skin tends not to fold as it does with excess subcutaneous tissue (Figure 7).

Since the axillary nodes lie deep to the SLA, this effect is also seen with malignant nodal metastases. Instead of increased subcutaneous bulk leading to skin folding, it tends to stretch the skin to produce a rounded mass, without folding of overlying tissues (Figure 8). Therefore, larger or more extensively involved axillary nodal masses would have an

Figure 6 Abdominal distention in a patient with a large pancreatic pseudocyst. Note the absence of skin folding. The skin is pulled tight and stretched due to the sub-fascial distention.

Figure 7 Skin-folding in a morbidly obese woman with a body mass index of 50.2 kg/m^2. In this case, there are numerous skin folds because the fat deposition occurs in the subcutaneous plane above the fascia.

even greater propensity to stretch the overlying tissues instead of producing the folding necessary for a V-sign. Enlarged axillary nodes could accentuate the single crease of a normal axilla but would not produce folding to form a V-sign.

Although AABT can be detected by recognition of the V-sign, it could disappear during abduction of the arm as is done during clinical examinations, especially when the AABT is small (Figure 9). Moreover, the V-sign is formed by soft tissue that can be missed on palpation. Therefore, careful inspection with the arm at the patient's side should be done routinely. On the contrary, enlarged axillary nodes are easily detected during the palpation phase of the clinical examination, making their detection simple.

There are other rare conditions that increase the bulk of subcutaneous tissues in the axilla and may produce a V-sign on clinical inspection. These include fibroadenomata,[5,6] lipomata,[7] and sebaceous cysts, but these are usually easy

Figure 8 Comparison of an axilla with accessory axillary breast tissue demonstrating two lines forming the V-sign (left) with an axilla with metastatic nodal disease (right) in which the axillary skin becomes stretched and accentuates the single line in the axillary crease, but not forming a V-sign.

Figure 9 Inspection of the axilla with the arm adducted, demonstrating the V-sign (left), and with the arm abducted (right) as done in clinical examinations.

to recognize during palpation, which is mandatory after inspection in all clinical examinations. Additionally, in cases where the clinical diagnosis remains uncertain after thorough inspection and palpation, a sonogram can be ordered because it is a very useful tool for the diagnosis of benign and malignant breast diseases.

Conclusion

Since breast cancer and its possible presentation as an axillary mass has been instilled in the minds of the public, women often experience great anxiety on finding an axillary mass. Moreover, many health care personnel, out of an abundance of caution, expose these women to unnecessary investigations that could increase their fear. Awareness and recognition of the V-sign can allay this anxiety, avoid confusion of these two entities, and prevent costly investigations and interventions in most cases.

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