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# Incidental Finding of Breast Tumor After Scoliosis Surgery: A Case Report

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## ABSTRACT

**Introduction:** Breast asymmetry (BA) is a common condition in patients with adolescent idiopathic scoliosis (AIS). Physicians may misdiagnose a patient with a unilateral breast tumor as a normal condition related to scoliosis. The present report describes the case of a patient with a breast tumor that was detected incidentally after surgical correction of scoliosis.

**Patient Presentation and Outcomes:** A 21-year-old woman was diagnosed as having AIS and reported to our institute for management. Thoracic third to lumbar second vertebra instrumented spine de-rotation and associated fusion surgery were performed to correct the deformity. After the operation, enlargement of left breast volume and obvious BA were noted. Breast sonography was performed, and a large tumor was found. Finally, the biopsy revealed a fibroadenoma of the left breast.

**Conclusions:** In managing patients with scoliosis and BA, comprehensive consideration of other possible etiologies is crucial to prevent misdiagnosis. This article reminds physicians that breast tumors can be concealed by BA related to AIS.

**Level of Evidence:** 5.

Case Report

Keywords: scoliosis, breast asymmetry, fibroadenoma

## INTRODUCTION

Scoliosis is defined as more than 10° of spinal lateral deviation and 3-dimensional torsion in the spinal structure.<sup>1</sup> Although the deformity may be related to congenital vertebral disorders, most of them are idiopathic and can be further classified into 3 categories according to the patients' age.<sup>2</sup> Adolescent idiopathic scoliosis (AIS) commonly occurs in teenage girls and is the most common type of scoliosis with an overall incidence of 0.47% to 5.2%.<sup>3</sup> Among these patients, the spinal structures are not only deviated but also rotated, which results in a 3-dimensional torsional deformity.<sup>1</sup>

Breast asymmetry (BA) refers to the difference in volume, shape, and/or position between bilateral breasts. Although idiopathic BA is observed in most women, it is usually mild and unnoticeable. However, an obvious BA can be detected when caused by trunk torsion and chest wall deformities related to AIS.<sup>4</sup> Shi et al evaluated 73 patients with surgically treated right thoracic AIS and revealed that the concave breast was larger than the other breast.<sup>5</sup> Although BA is quite common in patients with AIS, the relationship between BA and spine deformity is still unknown.<sup>4,5</sup> Deformities of the chest wall could be variable in patients with similar Cobb's angles. Ramsay et al conducted a

cross-sectional descriptive study on 30 female patients with AIS and revealed the absence of a statistically significant difference between the BA and the Cobb angle or rib hump.<sup>6</sup> Hence, the condition of the BA may be unchanged or even worsen after the correction of thoracic scoliosis.

Herein, we present the case of a female patient with AIS who underwent surgical treatment. After surgery, an obvious BA was noted, which was confirmed to be caused by a fibroadenoma of the left breast.

## CASE REPORT

A 21-year-old woman presented to our institute with a progressed trunk deformity for years. She was a generally healthy student without any specific underlying medical history of hypertension, diabetes mellitus, or other congenital disorders. AIS had been diagnosed for years, and conservative methods, such as bracing and physical therapy, were performed to manage the condition, but the results were unsatisfactory. Progression of the spinal deformity and an increase in Cobb angle were noted on radiographic examinations during follow-up. Hence, a surgical intervention was performed to correct the deformity. Preoperative imaging revealed severe



**Figure 1.** A 21-year-old woman presented because of progressed trunk deformity. Anteroposterior (A) and lateral (B) views of whole-spine radiographs revealed scoliosis with a Cobb angle of approximately 50°.

scoliosis with a Cobb angle of 52° and a right convex thoracic curve (Figure 1). During the physical examination before surgery, a right rib hump was found during Adam's forward bending test. However, no apparent BA was observed. Subsequently, instrumented spine fusion surgery of the third thoracic to the second lumbar vertebrae was performed to correct the deformity (Figure 2). However, enlargement of the left breast volume and obvious BA were incidentally observed postoperatively (Figure 3). Chest radiography was performed because pneumothorax with subcutaneous emphysema was suspected but showed normal findings. We also performed a comprehensive physical examination because local swelling or hematoma accumulation caused by direct compression during surgery was suspected, but the findings were negative. Breast sonography was performed, and a large tumor was found in the left breast. Because the possibility of malignancy could not be ruled out, a



**Figure 2.** Spinal alignment corrected after the operation, as demonstrated in anteroposterior (A) and lateral (B) views of whole-spine radiographs.

surgical biopsy was performed, and the mass was diagnosed as a fibroadenoma (Figure 4).

## DISCUSSION

BA is not uncommon in the general population and affects more than half of women.<sup>7</sup> It may be related to many factors, such as trauma, puberty, and hormonal changes. Although most BAs are not

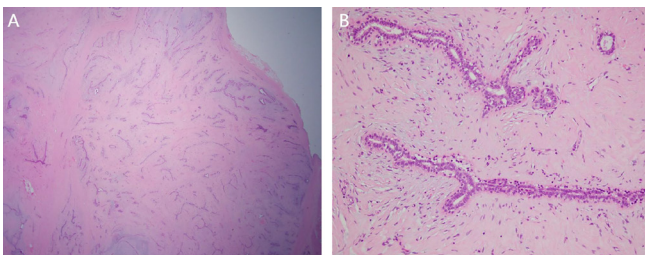


**Figure 3.** Obvious breast asymmetry noted postoperatively.

of concern, they can be a cosmetic problem and can affect patients' body image. Furthermore, some BAs may be caused by benign breast tumors or even cancer, which requires immediate treatment.<sup>8</sup> Comprehensive physical examination and adequate imaging studies, such as mammography, sonography, or magnetic resonance imaging, are crucial to determine their etiologies.<sup>8</sup>

AIS is a female-dominant spinal disorder with a 3-dimensional deformity. Among these patients, BA is 1 of the common complaints.<sup>4-6</sup> It is widely believed that the inequality between bilateral breasts is secondary to chest wall deformity and trunk torsion.<sup>9</sup> To date, several studies have demonstrated breast and chest wall asymmetries in patients with scoliosis.<sup>4-9</sup> Currently, scoliosis correction followed by posterior instrumented spinal fusion has been considered an efficient procedure to correct the spinal deformity.<sup>1</sup> However, the shape of the anterior chest wall is highly variable in patients with similar Cobb angle.<sup>6</sup> The breast and chest wall asymmetries may persist or even worsen after surgical correction of scoliosis.<sup>9</sup>

The treatment of AIS is determined by the severity and progression of the spinal curvature. A well-designed and adapted brace is usually used for a growing child with a spinal curve of 20° to 45° or progression of more than 1° per month.<sup>10</sup> Surgical intervention is indicated for a



**Figure 4.** Microscopic examination of biopsied mass at (A)  $\times 100$  magnification and (B)  $\times 400$  magnification with hematoxylin and eosin stain revealed fibroadenoma of the breast comprising elongated and dilated mammary ducts in the fibromyxoid stroma.

curve exceeding 45° to 50° by Cobb's method.<sup>11</sup> Hence, serial full-spine radiographic examinations are crucial for decision-making in these patients. A major concern related to radiographic examinations is radiation exposure, which may increase the risk of breast cancer. The period before the onset of menarche and after Tanner stage breast-2 is hypothesized to be particularly sensitive to radiation and other carcinogens. Doody et al conducted a retrospective cohort study and revealed 1.69 (95% CI, 1.3–2.1) times breast cancer deaths in women with scoliosis when compared with the mortality rates in a similar cohort in the United States.<sup>12</sup> Luan et al conducted a systematic review of 9 studies involving 35,641 participants and revealed a significantly higher incidence of cancer, breast cancer, and cancer mortality in patients with scoliosis.<sup>13</sup> Therefore, the increased risk of breast cancer should always be taken into consideration in patients with AIS who require regular follow-up.

Breast cancer diagnosis usually begins with a comprehensive physical examination and detailed medical history. The presence of a palpable mass or BA may indicate breast cancer. Further studies, such as mammography, sonography, and magnetic resonance imaging, may be required to make a correct diagnosis.<sup>14</sup> However, BA is common in women with AIS and may conceal the existence of breast cancer. A tumor in a smaller breast can increase in size and masquerade as a symmetric breast. Hence, it is crucial to examine the breast through careful palpation to detect the presence of masses, even when the breasts are symmetric.

Fibroadenoma of the breast is a benign tumor that presents as a solid lump and commonly occurs in women aged between 14 and 35 years.<sup>15</sup> This lesion should be differentiated from various breast disorders, especially breast cancer, because they share similar clinical features. It is a common disorder and has been estimated to affect approximately 10% of the female population worldwide. The mass is rubbery and firm, with regular borders and variable size. Although its etiology is debatable, it is widely accepted that these lesions are related to female estrogen levels. This hormonal theory is supported by the fact that the tumor usually grows during pregnancy but shrinks after menopause. Treatment is typically unnecessary in such cases because of the benign nature. However, it must be removed if it continues to grow or is sufficiently large to compress other breast tissues.

## CONCLUSION

In conclusion, BA is a common presentation in patients with AIS and breast tumors. For patients with AIS and

breast tumors, the breasts could be symmetrical if the tumor exists in the smaller breast. To our knowledge, this is the first report to discuss this unusual presentation. This case serves to remind physicians that breast tumors can be concealed by BA related to AIS. Therefore, careful history-taking and physical examinations, followed by proper imaging studies, are necessary.

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