Case Report Open Access

Archives Of Breast Cancer

DOI: 10.32768/abc.2023104309-402

Refractory Axillary Web Syndrome Successfully Treated with Steroid Injections: A Case Report

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ARTICLE INFO

Received:
13 June 2023
Revised:
1 September 2023
Accepted:
8 September 2023

Keywords:
Axillary Web Syndrome, cording, breast cancer, case report

ABSTRACT

Background: Axillary Web Syndrome (AWS) manifests after breast cancer surgery as 1mm wide, singular, or multiple cords that can extend from the ipsilateral axilla to the antecubital fossa and further into the forearm and wrist. These cords can be painful and cause diminished range of motion. Even though there is no current standard treatment for AWS, physical therapy is recommended as the first approach in management. In refractory cases, no management has been proposed.

Case Presentation: We present a case of a 59-year-old female with right-sided breast pain and a palpable cord, refractory to one year of physical therapy, which began at the inframammary fold up towards the lumpectomy scar and further towards the axilla. Cord developed post-lumpectomy and post-radiation for a right-sided stage I invasive ductal carcinoma with negative sentinel lymph node biopsy. Based on the refractory nature of the cord, the patient underwent three treatments of steroid injections which made the cord less palpable and improved the pain. Due to persistent diminished range of motion and tenderness, the patient underwent a percutaneous needle cord disruption procedure with a last round of corticosteroid injection to prevent adherence of the cord pieces. At a 7-month follow up post-procedure, the breast cord was no longer present, and range of motion had been restored.

Conclusion: We found that percutaneous cord disruption with concurrent steroid injections can be an effective treatment for AWS refractory to physical therapy.

INTRODUCTION

Axillary Web Syndrome (AWS) or cording, first described in 2001, presents as a 1mm wide, singular or multiple cords that develop after breast surgery. They can extend from the ipsilateral axilla to the antecubital fossa and further into the forearm and wrist or from the breast down the lateral edge of the ipsilateral chest wall.[1,2,3] AWS frequently presents with pain and limited shoulder range of motion, specifically abduction.[1,4] Sometimes these symptoms are the first sign of cording, even before the cord is visible.[5] AWS is seen as a complication of breast cancer and melanoma surgery, including sentinel node biopsy and axillary lymphadenectomy.[3] The prevalence of AWS secondary to breast cancer surgery varies widely with studies reporting rates ranging from 6% to 85.4%.[2,6-8] The pathophysiology of AWS is still actively being investigated, and even though current recommendations involve physical therapy, no standardized management has been established for this condition. We present a case of refractory breast cording treated with percutaneous cord disruption with steroid injections as adjunctive therapy.

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CASE PRESENTATION

We present a case of a 59-year-old female with a 1-year history of right-sided breast pain and palpable breast cord post-lumpectomy and radiation with negative sentinel lymph node biopsy for a stage Ia invasive ductal carcinoma (Figure 1).

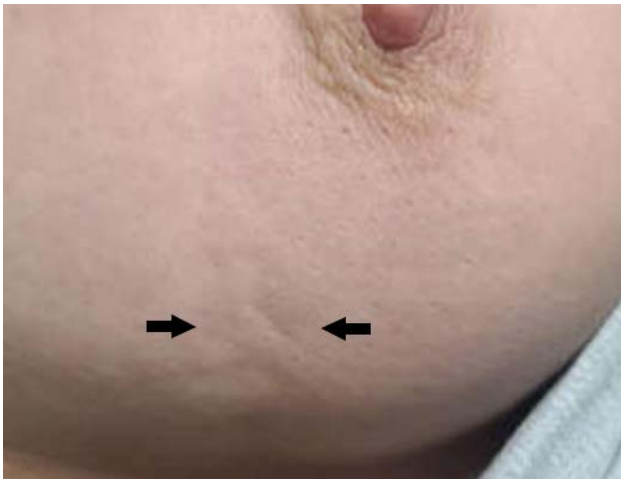

Figure 1. 59-year-old woman with cording on right breast from the inframammary fold up towards the lumpectomy scar post-lumpectomy with sentinel lymph node biopsy and radiotherapy for a stage Ia invasive ductal carcinoma.

On physical examination, the breast cord was immediately subcutaneous and began at the inframammary fold (IMF) up towards the lumpectomy scar. Tenderness to palpation was present on the cord itself and on the inframammary fold. The patient also described limitations in her range of motion due to the pain. The patient noticed the development of two cords, one in the right axilla and one on the right breast, after completion of radiation - about 2 months after breast surgery. The axillary cord had resolved within 6 months of its development with manual therapy techniques including manual lymphatic drainage, tissue bending, and skin stretching; however, the breast cord persisted despite treatment. The patient had a previous outpatient procedure by a breast surgeon that consisted of cutting a specific band of the cord at the IMF with a scalpel blade to divide the palpable cord. This procedure did not improve the patient's symptoms. Other relevant history included ipsilateral lymphedema which was being treated by a lymphedema therapist at the time of presentation as well as history of a seroma at the lumpectomy site.

Based on the presentation and previous treatment failure, we decided to treat the breast cord with steroid injections. The patient underwent three treatments of steroid injections to the inferior aspect of the cord with triamcinolone 40mg (treatment 1 and treatment 2) and 50mg (treatment 3) mixed with 1% lidocaine. There was a 3-week period between the first and second and a 5-week period between the second and third treatments. After the treatments, the cord was less palpable, and tenderness had decreased. Due to the persistent pain and limited range of motion, needle rigotomy (dividing the cord into several pieces percutaneously using an 18-gauge needle) was performed on the palpable cord, and triamcinolone 40 mg was injected to prevent the adherence of the cord pieces. At a 7-month follow-up after the procedure, the breast cord had not reoccurred. Her range of motion had greatly improved, and she was no longer experiencing pain. The patient was advised to continue lymphedema therapy throughout this time to prevent the recurrence of the lymphedema. She was undergoing yearly breast cancer surveillance with mammograms, which showed postoperative changes to the right breast with no dominant masses.

DISCUSSION

AWS has been found to typically develop within the first 8 weeks after breast surgery, with symptoms resolving within 12 weeks.[2,8] However, recent studies have shown that this condition can occur months to years later, which can be either recurrent or persistent.[2,9,10] One study reported a case of a patient that experienced first symptoms more than 16 years after surgery.[11] Another study found that the cumulative incidence of AWS was 57% at 5 years.[9] Even though the pathophysiology of AWS remains to be fully elucidated, histological examination has shown dilated, thrombosed lymphatic vessels, thrombosed superficial veins, or both.[6,12] These findings may make AWS difficult to be differentiated from Mondor's disease, thrombosis of superficial chest wall vein, but Mondor's presents with a vessel-like appearance that is thicker than AWS, and can have occasional redness or swelling, and may occur after breast augmentation surgery.[3]

When evaluating the characteristics of women with cording, the risk of AWS increases with BMI <30kg/m^2, age < 55 years of age at the time of breast cancer diagnosis, and more advanced disease.[1,4,6,10,13] One study found that obese women have a 15% less risk to develop AWS which can be due to the cords being less palpable through a thicker subcutaneous layer.[1] Therefore, it is possible that obesity might not be a protective factor for AWS, but instead it might hinder its diagnosis. The type of breast surgery also affects AWS risk. In a study by Bergmann *et al.*, 73.5% of women that underwent mastectomy developed AWS, while 16.3% of women that underwent breast conservative surgery developed AWS.[1] Women that undergo sentinel lymph node biopsy (SLNB) have been shown to have less risk of AWS compared to those that undergo axillary lymph node dissection (ALND).[1,4,10,13] This can be due to SLNBs being less disruptive of the lymphatic system

than ALNDs.[2] Furthermore, those with a positive sentinel lymph node biopsy have an increased AWS risk of 62%.[1] The findings of the impact of radiotherapy and chemotherapy on the development of AWS vary among studies. While some studies have found no increase in the risk of AWS with radiotherapy and chemotherapy, others have found that patients are less likely to develop AWS if they have undergone radiotherapy and more likely if they received neoadjuvant chemotherapy.[1,4,11] In our case, the patient had undergone breast conservative surgery with a negative SLNB and did receive radiotherapy. Our patient developed cording soon after finishing radiotherapy which contradicts previous findings of radiotherapy being associated with a lower risk of AWS.

Certain post-op complications have been associated with an increase in AWS. Among women that developed AWS, a study found that 37.9% had a history of seroma, 20% had a history of tissue necrosis, and 7.25 had a history of hematoma, and 12.3% had a surgical site infection with only hematoma statistically associated with doubling the risk of AWS.[1] Injury to the intercostobrachial nerve during surgery, manifesting as numbness in the arm, has also been found to increase the risk of AWS by 3.19 times.[1,4] The relationship between AWS and breast cancer-related lymphedema (BCRL) has been investigated with no agreement in the literature. One study found that among women with BCRL, 44.2% reported cording at some point postoperatively with 95.0% reporting cording before or at BCRL onset.[4] Another study found that women with AWS had a 44% increased risk of developing lymphedema during the first postoperative year, and that those who developed AWS within the first postoperative month were 3 times more likely to develop lymphedema within the first 3 postoperative months.[14] However, another study that followed breast cancer patients for five years postoperatively found no association between AWS and lymphedema.[9] In our case, our patient had a history of seroma and developed ipsilateral lymphedema with the initial development of the cords.

Even though no standard treatment has been proposed for AWS, many studies have found that early-on physical therapy is beneficial.[9,15] It has been recommended that physical therapy management should include active and passive shoulder range-of-motion exercises, lymphatic drainage, gentle stretching, and therapeutic massages.[2,16] One study showed that not receiving postoperative exercises instruction and/or not doing postoperative exercises significantly increased the risk of cording.[4] It has also been found that there has been a significant improvement in shoulder function in a group that started physiotherapy between the 6th and 8th postoperative weeks than those that started after the 26th postoperative week.[15,16] Thus, it is important for patients to start physical therapy early in the postoperative period to minimize the pain and appearance of cords and improve range of motion. Other described treatments include pain management with nonsteroidal anti-inflammatories and moist heat.[17]

Our case shows an example of breast cording refractory to one year of physical therapy treatment. There is a lack of alternative treatments for refractory cording. One study by Piper *et al.* investigated the use of percutaneous needle cord disruption with autologous fat grafting and Xiaflex® injections, a collagenase derived from *Clostridium histolyticum* that is FDA-approved for Dupuytren disease.[17] The study found that percutaneous cord disruption with fat grafting and Xiaflex® injections immediately improved the passive range of motion and appearance of the cords with the injections also reducing the associated pain.[17]

CONCLUSION

To our knowledge, there has not been a case in the literature that has described the use of steroid injections for the management of AWS. As seen in our case, the percutaneous needle cord disruption procedure with concurrent steroid injections had the best effect as it completely disintegrated the cord and the pain resolved – a finding that needs further exploration.

With breast cancer being the most common cancer in women, it is important to highlight axillary cord syndrome as a common complication of breast surgery. Even though the etiology of this condition is unknown, early intervention can prevent future consequences of cording. The primary treatment for AWS involves physical therapy; however, our case shows that percutaneous cord disruption with steroid injections can be a possible effective treatment for refractory AWS.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ETHICAL CONSIDERATIONS

Informed consent was obtained from the individual participant included in the report.

FUNDING

None.

ACKNOWLEDGMENTS

None.

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How to Cite This Article

Maldonado GM, Adepoju O. Refractory Axillary Web Syndrome Successfully Treated with Steroid Injections: A Case Report. Arch Breast Cancer. 2023; 10(4):399-402.
Available from: https://www.archbreastcancer.com/index.php/abc/article/view/748