

Surgical treatment of brachial plexus carcinoma metastasized from non-ipsilateral breast cancer

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ABSTRACT

تتضرر الضفيرة العضدية نتيجة للعديد من الأسباب، غير أن تأثير الورم التنقيلي على الضفيرة العضدية في الجانب الآخر من الجسم يعد أمراً نادراً. نستعرض في هذا المقال حالة مريضة تبلغ من العمر 56 عاماً، وقد أصيبت بسرطان الضفيرة العضدية وذلك بعد انتقال الورم من الثدي إلى الضفيرة العضدية في الجانب الآخر من الجسم. لقد تم عمل الفحوصات اللازمة بعد دخولها إلى المستشفى والتي أثبتت صحة التشخيص، وبعد ذلك قمنا بإزالة الكتلة السرطانية من داخل وخارج الثقبية. لقد استعادت المريضة تدريجياً الإحساس في طرفها العلوي الأيسر وذلك بعد العملية بشهر واحد، غير أنها توفيت بعد العملية بشهرين بسبب فشل الأعضاء المتعدد. تشدد هذه الحالة على أهمية معرفة السبب المسئول عن تضرر الضفيرة العضدية أثناء عملية التشخيص حيث أن اضطرابات الضفيرة العضدية قد تحصل في جانب الجسم الآخر والغير مُصاب.

Lesions of the brachial plexus may arise for various reasons. Metastatic carcinoma involving the non-ipsilateral brachial plexus is a relatively rare condition. This report presents the case of a 56-year-old woman with brachial plexus carcinoma metastasized from non-ipsilateral breast cancer. After admission, minute examinations were arranged, which gave support to the previous diagnosis. Extended resection of the tumor mass in- and outside the foramen was performed. One month after the operation, the sensation of the left upper extremity began to recover gradually. Due to multi-organ failure, she died 2 months post-surgery. This case underscores the need for appropriate diagnosis of brachial plexus abnormalities. In addition to the common causes, it should be noted that brachial plexus abnormalities could even occur on the contralateral side.

Neurosciences 2011; Vol. 16 (1): 57-59

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Received 7th August 2010. Accepted 19th September 2010.

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Lesions of the brachial plexus can be a serious threat to human life since the brachial plexus controls functions of the upper extremities. It is important to point out that metastatic carcinoma involving the brachial plexus, though rarely reported, may also cause similar dysfunction of the upper extremities, and thus may be misdiagnosed or improperly treated. In the current study, we describe a case of brachial plexus carcinoma metastasized from non-ipsilateral breast cancer and the result of its surgical treatment. Our objective in presenting this particular case is to prompt an unusual and easy-neglected cause for earlier diagnosis and appropriate treatment for the disease.

Case Report. A 56-year-old woman was admitted for dysfunction in the left upper extremity and a tumor on the left side of her neck. Four years earlier, she had been diagnosed with breast cancer on the right side. At that time, she underwent an extensive radical mastectomy followed by routine chemotherapy and radiotherapy, which lasted for 3 months. Six months prior to the present admission, she began to experience difficulty when lifting her left upper extremity and felt pain and muscle atrophy around the left shoulder. The symptoms continued to aggravate, and 4 months prior to admission, a coin-sized painful tumor appeared on the left side of the cervical region.

Physical examination and CT scan. She exhibited left square shoulder deformity, hypoesthesia on the deltoid region, and tenderness around the left shoulder. All other body parts had normal sensation. The angle formed by the abduction of the shoulder was 0°. Obvious atrophy of the supraspinatus and infraspinatus deltoid were observed with a manual muscle testing (MMT) grade 0. The MMT of the left latissimus dorsi and both heads of the pectoralis major was grade V. The angle formed by the flexion of the left elbow joint was 10°, and MMT of the left biceps muscle was grade 0. Electrophysiology revealed severe, and possibly irreversible, damage of the truncus cranialis of the left brachial plexus. On the left side of the cervical region, 3 cm above the inner one-third part of the clavicle, a tumor 4 cm × 2 cm was palpable,



Figure 1 - An MRI examination of the left brachial plexus showing the tumor (arrow).

with obvious tenderness and a not very smooth surface. The transverse motility of the tumor was significant, while the axial motility was not. Tinel's sign was positive when percussion on the tumor was performed. An MRI of the left brachial plexus and the tumor showed obvious enlargement of the left intervertebral foramen on the C5 and C6 (Figure 1). Abnormal flaky signals of irregular shape and clear margin extended from the inside to the outside of the foramen and wrapped around the truncus cranialis of the left brachial plexus (including C4 to C7). The subarachnoid cavity of the left side between C4 and C6 was enlarged, and the spinal cord of the relevant cervical segment was constricted. This result indicates a widespread tumor mass. A CT scan of the lung manifested similar to that of the one carried out after the mastectomy: tuberculosis on the lingular lobe, chronic inflammation on both superior lobes of the right lung and the inferior lobe of the left lung, abnormal manifestation on the superior lobe of the right lung (lymphangitis carcinomatosa could not be excluded), intumescences of the mediastinal lymph node, and thickening and calcification of the right pleura. A CT

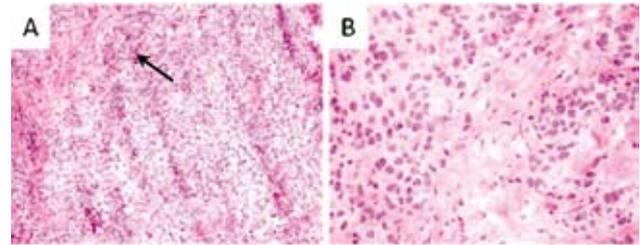


Figure 3 - Initial histopathological examination of the tumor tissue. A) Microscopic magnification x 100. B) Microscopic magnification x 400.

scan of the abdomen showed no sign of tumor, but hepatic adipose infiltration and multiple calcifications of the liver and spleen were present. Based on these results, it can be concluded that the breast cancer had metastasized hematogenously to the pleura/lung, and hematogenous metastasis should explain the occurrence of metastasis at the contralateral brachial plexus.

Surgical treatment. Considering the size of the tumor mass and the evidence that the tumor had affected the cervical cord (which was of vital importance to respiration and circulation), an immediate operation was strongly recommended to release this compression. The operation was performed under general anesthesia. A typical operative approach was employed to expose the brachial plexus. As shown in Figure 2A, fusiform hyperplasia with irregular intumescencia was found in the C5 and C6 root, truncus cranialis, suprascapularis, and dorsal scapular nerve. The tumor had spread to the foramens and peripheral tissues (Figure 2B). When the tumor outside the foramen was exposed completely, a portion of the tumor was excised. As shown in Figure 3, histopathological examination of the excised tissue confirmed the case as carcinoma. Based on this result, the affected nerves that were outside the foramen were completely excised. In addition, curettage of the affected

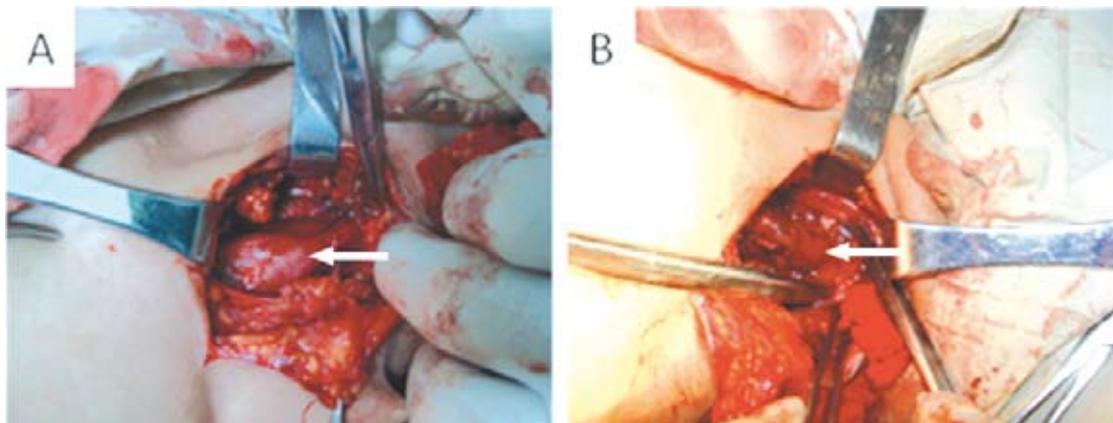


Figure 2 - Gross anatomic features of the tumor. A) Fusiform hyperplasia with irregular intumescencia in the C5 and C6 roots. B) The spreading of truncus cranialis, suprascapularis, and dorsal scapular nerve into the foramens, with moderate adhesion to peripheral tissues.



Figure 4 - Gross anatomy of the excised tissues. Excised tissues included the affected nerves outside the foramen and curettage of the affected tissues inside the foramen, which had a full-formed margin.

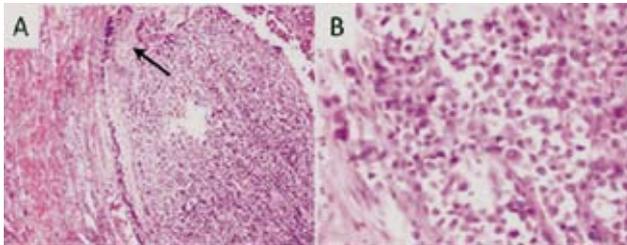


Figure 5 - Confirmatory histopathological examination of the excised tumor tissue. A) Microscopic magnification x 100. B) Microscopic magnification x 400.

tissues inside the foramen was also excised (Figure 4). The anterior and posterior divisions of the C7 brachial plexus were then connected to those of the truncus cranialis, using microsurgical techniques. All the excised tissues were further examined by a pathologist. As shown in Figures 5A & 5B, the metastatic cancerous node of the left brachial plexus resembles cancer of breast origin. Immediately after the operation, she received anti-infection, and nerve nutrition therapy continuously. On the third day post-surgery, she started to experience hyperesthesia in the left upper extremity, which disappeared on day 7. One month after the operation,

the sensation of the left upper extremity began to recover gradually. Two months after the operation, she received chemotherapy, but succumbed during the therapy due to multi-organ failure.

Discussion. Common causes of brachial plexus lesions include external force, obstetric palsy, and injuries as a result of surgery,¹⁻³ each of which needs to be treated differently according to its cause and severity. The cause of death in this case was clearly related to the progression of breast cancer metastasis. The metastatic carcinoma of the brachial plexus and primary breast cancer occurred on the opposite side, which may explain why it was initially missed and inappropriately treated. Brachial plexus lesions caused by common causes mentioned above often happen in a limited area and seldom deteriorate further. However, those caused by metastatic carcinoma, due to the characteristics of the carcinoma itself, according to type, are often unlimited, and can spread into any surrounding tissues, possibly making the lesion worse. Thus, this case underscores the need for appropriate diagnosis of brachial plexus abnormalities according to the etiology, in addition to the common causes, brachial plexus abnormalities can be due to carcinoma even occurring on the contralateral side, which is of vital importance in appropriate therapy decision making.

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