

# INTRATHORACIC MIGRATION OF PREOPERATIVE BREAST LOCALIZATION WIRE: A RARE CASE REPORT

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**Abstract – Objective:** Preoperative needle localization under ultrasound or stereotactic guidance is an integral part of breast cancer surgery. Procedure related complications are rare, and migration of the localization wire is extremely rare.

Herein, we present a case of wire migration from the breast to the lung apex in a 49-year-old woman, who refused the therapeutic removal of wire for one year after migration.

**Case presentation:** Preoperative wire localization under ultrasound was performed in a patient with a non-palpable breast cancer. The wire could not be found during lumpectomy and it had been proven to be in thoracic cavity in recovery room. The patient refused any intervention for wire removal; accordingly, she underwent external radiation therapy following breast-conserving surgery. The computed tomography (CT) scan confirmed the fixed wire position at 3, 6, 9, and 12 months after wire migration. Despite frequent explanations about the possible late complications, she refused wire removal until one year. During this period, she was closely followed-up for the wire position via imaging. Finally, after 12 months, the patient accepted wire removal by video-assisted thoracoscopic surgery (VATS) which was performed without complication.

**Conclusions:** Although preoperative wire localization for occult breast lesion is effective and safe, rare complications like migration have been reported and need early intervention.

**KEYWORDS:** Localization wire, Migration, Breast.

## INTRODUCTION

Today, considering the improvements in early detection of breast cancer, and increasing use of neo-adjuvant chemotherapy for decreasing size of breast tumors, wire localization of nonpalpable masses is more widely applied for accurate surgical excision<sup>1</sup>. Although complications of this procedure are rare, vasovagal reaction (7%), bleeding (1%), infection (1%), and wire breaking (1%) are well recognized<sup>2</sup>.

Another rare complication of wire localization is migration of the wire to extramammary sites. Migration of wire to the psoas muscle near the inferior vena cava and even to the flank and gluteal region and supraclavicular fossa has been reported in the literature<sup>3-5</sup>. Serious complications like intrathoracic migration of breast localization wire could rarely occur<sup>1,6-10</sup>.

Herein we reported a case of intrathoracic migration of wire, which remained fixed during adjuvant therapy and was removed easily after one year by thoracoscopy.

## CASE PRESENTATION

A 49-year-old woman presented with a suspicious irregular mass on the mammogram and breast ultrasonography. Physical examination confirmed a deep vague thickening in the lateral part of the right breast without pathologic lymph nodes in the axilla. The core needle biopsy revealed moderately differentiated invasive ductal carcinoma (ER+ and HER2-). She was scheduled for breast lumpectomy and sentinel node biopsy. Preopera-



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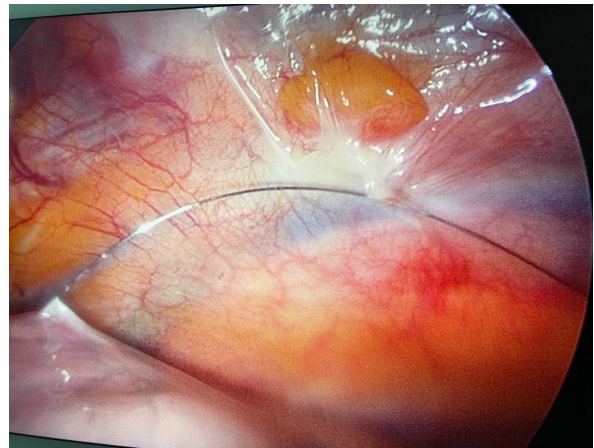
tively, wire localization was performed by a TSK wire (Japan) with a 20-gauge needle, through which a 10-cm long monofilament wire was inserted into the mass. The tail of the wire was fixed on the skin by an adhesive tape.

The patient showed a vasovagal reaction and experienced drop attack in the mammography room. However, after she recovered, a routine image showed that the tip of the wire was in the mass near the pectoral muscles. She was transferred from the radiology ward to the operating room after one hour. The wire was not found under breast dressing and could not be located in the breast during surgery. A lumpectomy was performed, and specimen mammography confirmed the correct removal of the mass and the wire was not in the specimen. The chest roentgenogram during recovery also showed the metallic wire, which was longitudinally located in the anterior chest wall, without causing pneumothorax or any other complication.

Computed tomography (CT) scan of the thorax showed that the wire was drawn vertically from the diaphragm to the third intercostal space, and the tip of the wire was located adjacent to the upper lobe of the right lung (Figure 1). The patient refused thoracoscopic removal of the wire after surgery; therefore, she received her adjuvant therapies including chemotherapy, endocrine therapy and external beam radiation. This case was discussed in our multidisciplinary tumor board before every step of adjuvant therapies. After 12 months, she accepted wire removal using VATS (Figure 2). During this period, she was under close follow-up by monthly exam and by CT scan every three months.



**Fig. 1.** Intrathoracic hooked wire migration after breast localization.



**Fig. 2.** Thoracoscopic removal of migrated hook wire after 12 months.

## DISCUSSION

Preoperative wire localization using ultrasonography or mammography is currently the most widely used localization method for surgical excision of nonpalpable lesions. However, localization wires do not always remain at the site of insertion adjacent to the target lesion. Migration can occur within the breast tissue and also to the extramammary site. Retraction is promoted if the wire is not sufficiently long, not promptly secured to the skin, or not bent. Although the wire is usually covered with gauze and taped down on the patient's breast, it will be advisable to minimize the patients' breast and ipsilateral arm movements during transportation to the operation room. Also, the short transit time to the operation room can protect the wire complications, so the wire should be positioned ideally at the day of surgery. Using parallel approach to the thoracic wall for wire insertion reduces the risk of pleural penetration and pneumothorax but some centers prefer anteroposterior approach for preoperative localization.

Fatty breasts are more prone to migration of wire and tissue markers. This may be explained by less anatomic structure resistance of fatty tissue to migration. Among a total of 665 guide wire localization in a single center, only two cases of wire migrations in two obese patients had been reported<sup>11</sup>. Both wires were successfully retrieved one from breast tissue and the other from the contralateral neck muscles and both patients had huge and fatty breasts. Also in one report tissue markers migration had been shown in stereotactic biopsies in nearly 26% of patients with fatty breast<sup>12</sup>.

Some believed that shape of the wire tip is also responsible for migration, entrapment the open hook to the muscle can initiate migration and ev-

ery muscle contracture can result in further penetration of wire<sup>2</sup>. Bristol et al<sup>6</sup> reported muscular contraction as the causative factor involved in wire retraction. They reported a case of wire retraction to the pleural cavity. Tykka et al<sup>7</sup> in 1993 reported a patient where the hook wire penetrated the pleural cavity and caused a small pneumothorax. Four other cases of migration to the pleural cavity and pulmonary hilum have been reported by Rissanen et al<sup>8</sup> in 1993, Mitus et al<sup>9</sup> in 2004, Banitalebi et al<sup>1</sup> in 2005 and Bachir et al<sup>10</sup> in 2018. Moreover, Susstane et al<sup>2</sup> reported a case of wire migration to the pleural cavity, which had penetrated the ipsilateral phrenic nerve, causing paralysis.

Martinez et al<sup>13</sup> in 2003 reported the first case of wire penetration to the pericardium and myocardium overlying the left ventricle, which was managed nonsurgically. Additionally, Azouri et al<sup>14</sup> reported the first case of total intrapericardial migration of a hooked wire, which was successfully managed by VATS. Carbone et al<sup>15</sup> reported a hook wire migrating to the heart in 2009.

Delayed cardiac injury and pericardial penetration resulting from migrated wire has been reported even after two years. In this regard, Seifi et al<sup>16</sup> reported the case of a patient with cardiac tamponade two years after wire localization.

Echocardiography and CT scan confirmed the presence of a hook wire which had penetrated the pericardium and left ventricular myocardium through the aortic valve into the ascending aorta. It was removed successfully by surgery. It should be noted that the described report deeply influenced our patient's decision regarding her wire management. Her treatment plan changed from close follow-up via serial chest CT scan to VATS removal of the wire. The wire was successfully removed, and she was discharged in a good general condition after one day.

<https://youtu.be/caoOxroiSYo>

## CONCLUSIONS

Migration of breast localization wire is a rare but serious complication which should be treated by early removal.

## CONFLICT OF INTEREST:

The authors declare that there is no conflict of interests regarding the publication of this paper.

## INFORMED CONSENT:

The participant in this study signed the informed consent.

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