CASE REPORT

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Pericatheter Fibrin Sheath Calcification Mimicking Retained Catheter Fragment

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ABSTRACT Totally implanted central venous access ports (TIAPs) are reportedly safe and well-accepted among cancer patients. In most cases, TIAPs remain complication-free until treatment completion or death, with a complication rate of only 19% during the entire duration of device usage. The present report describes the case of a rare complication of TIAP, peri-catheter fibrin sheath calcification mimicking a retained catheter fragment. The present report would increase the awareness of this condition among medical professionals, which would prevent unnecessary additional examinations or endovascular/surgical interventions. In addition, it is recommended to inquire the cancer patients with low recurrence risk regarding TIAP removal after treatment completion to avoid the long-term complications of TIAPs, including central venous thrombosis, stenosis, occlusion, and peri-catheter fibrin sheath calcifications.

Keywords: Catheter; catheterization; central venous; vascular calcification

Totally implanted central venous access ports (TIAPs) are reported to be safe and well-accepted among cancer patients.[1] TIAPs are useful in the management of patients who require multiple chemotherapy sessions, parenteral nutrition, prolonged intravenous drug treatment (with antibiotics, etc.), and repeated drawing of blood. Moreover, chemotherapeutic agents are associated with less venous toxicity when administered via the central venous route. Most cases of TIAPs remain complication-free until treatment completion or death and present a complication rate of 19% during the entire duration of device usage.[1] In the case report presented here, a rare complication of TIAPs-peri-catheter fibrin sheath calcification mimicking a retained catheter fragment-is described to increase the awareness of this condition among medical professionals.

CASE REPORT

A 66-year-old male patient with multiple myeloma and lung carcinoid tumor visited the interventional radiology clinic for the removal of his non-functioning TIAP, which had been inserted for chemotherapy infusion over ten years ago. At the time of the clinic visit, the TIAP of the patient had been non-functional for the last three years and was complicated with superior vena cava occlusion. After written informed consent was obtained from the patient, TIAP was removed. The removal was mostly uneventful, except for a mild resistance encountered during the catheter pull-off from the central venous system (CVS). Upon gross inspection after its removal, the catheter was observed to be intact. One-month after the catheter removal, the patient underwent a routine chest computed tomography (CT) examination as a part of radiologic follow-up of cancer treatment. Incidentally, the chest CT image revealed tubular-shaped hyperdensities extending from the right innominate vein to the proximal portion of the superior vena cava. We were informed by our diagnostic radiology team regarding this, along with the suspicion of a retained catheter fragment in the CVS. After a thorough eval-

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uation of all the existing examinations of the patient along with the knowledge that the catheter was intact at gross inspection after removal (it is preferable to keep a record of the catheter lengths measured during insertion and after removal), we concluded that the tubular-shaped hyperdensities reflected a peri-catheter fibrin sheath calcification mimicking a retained catheter fragment. This conclusion was based on the following observations. The pre-removal chest CT image depicted that the port catheter was already accompanied by a certain degree of calcification at the distal end, along with coarse, irregular hyperdensities that were consistent with the calcifications, encasing the catheter around its proximal portion (Figure 1A). The post-removal chest CT image depicted a calcified fibrin cast (Figure 1B). Figure 2 depicts similar radiologic finding in chest X-rays. Upon closer inspection on pre-removal radiologic images, it was realized that the contours of the proximal portion of the catheter were irregular due to the calcifications, as opposed to the smooth contours of the mid/distal portion of the catheter.

DISCUSSION

TIAP-related complications include infection, malfunction, CVS thrombosis, stenosis or occlusion, arterial puncture, hemothorax, pneumothorax, and retained catheter fragment during insertion or removal. In rare cases, the complication is the peri-catheter fibrin sheath calcifications that mimic retained catheter fragments.[2-4] It is important to be familiar with this condition for both radiologists and clinicians who are responsible for patient care so that unnecessary additional examinations or endovascular/surgical interventions conducted for wrongly-diagnosed retained catheter fragments would be prevented. Peri-catheter fibrin sheath formation begins as early as 24 h after the catheter insertion and affects the complete length of the catheter within 5-7 days. Peri-catheter fibrin sheaths are formed of well-organized soft tissue that is resistant to degradation by the bloodstream. These sheaths attach permanently to the vessel wall after their formation.[2] Fibrin sheath occurrence rates in different cases range from 40% to 100%. These peri-catheter fibrin sheath might remain asymptomatic or could become the underlying cause of thrombosis, infection, catheter malfunction, medication extravasation, and in rare cases, pulmonary embolism.[5] Fibrin sheath calcifications are dystrophic calcifications, and total parenteral nutrition and longer dwell time are risk factors as they are in CVS thrombosis, stenosis, and occlusion.[4,6] Therefore, it is reasonable, in cancer patients with low recurrence risk, to remove the TIAPs as soon as the treatment is completed.

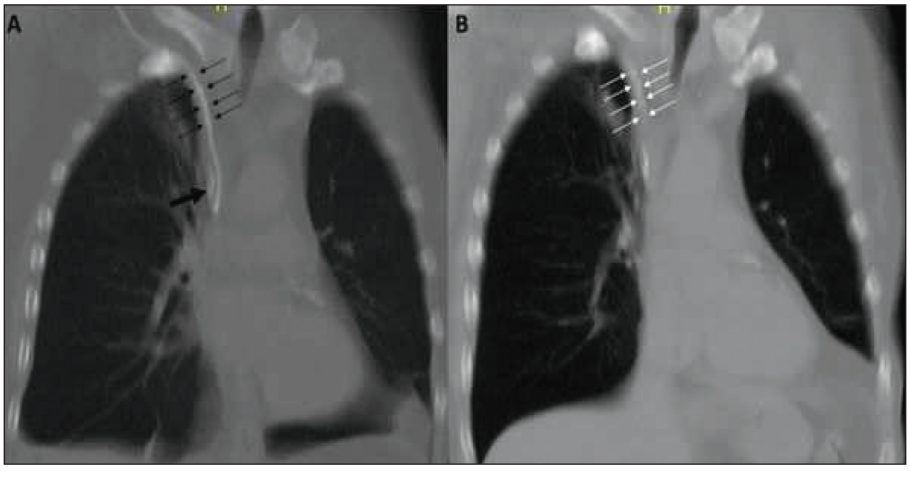

FIGURE 1: A) Pre-removal chest CT image depicting a port catheter already accompanied by a certain degree of calcification at the distal end (thick arrow), along with coarse, irregular hyperdensities that are consistent with the calcifications, encasing the proximal portion of the catheter (thin arrows). B) Post-removal chest CT image depicts peri-catheter fibrin sheath cast mimicking a retained catheter fragment (arrows). CT: Computed tomography.

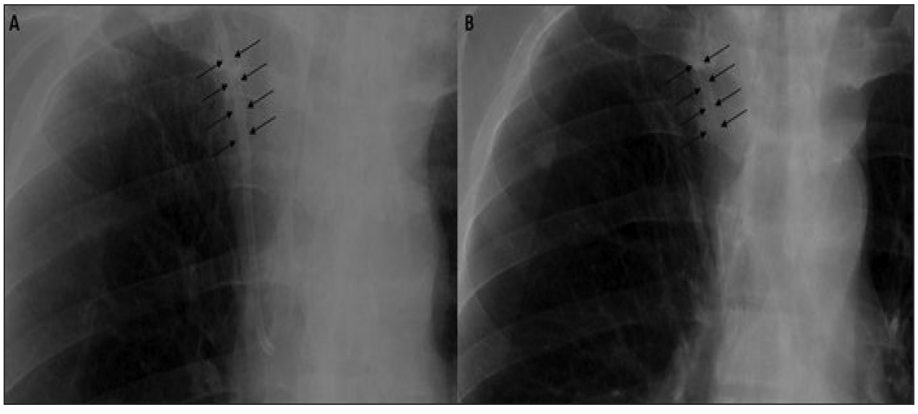

FIGURE 2: Pre-removal (A) and post-removal (B) chest X-ray images depicting peri-catheter fibrin cast prior to and after catheter removal (arrows).

Peri-catheter fibrin sheath calcification is challenging to diagnose if the involved medical professionals are unfamiliar with this condition. Anderson et al. reported a case that was led to surgery on account of suspicion of a retained catheter fragment after removal of the central venous catheter, with the surgical exploration only revealing a calcified thrombus without any retained catheter fragment.[7] Sabbaghian et al. reported a case suspected with retained catheter fragment in the left brachiocephalic vein upon a CT scan after the removal of a central venous catheter.[3] In this case, the patient's chest CT depicted radiodensities at the left brachiocephalic vein location, which were not revealed in the chest X-ray. Venography was performed subsequently, and it was concluded that these radiodensities were peri-catheter fibrin sheath calcification rather than a retained catheter fragment. Therefore, the authors suggested performing venography in the case of diagnostic uncertainty. In the aforementioned case, the diagnosis was also confirmed later in the postmortem autopsy, which revealed no retained catheter fragment. Peri-catheter fibrin sheath calcification could jeopardize the removal of TIAPs. In our case, although mild resistance was encountered during the catheter pull-off, the catheter removal was successful. On the other hand, Hughes et al. reported a pediatric case in which the TIAP could not be removed because of the calcified cast that encased the catheter.[8] In this case, removal of the catheter was not attempted further to prevent catheter fracture and/or pulmonary embolism.

Although cancer patients feel that it is safer to retain their TIAP after the completion of chemotherapy, mostly because of the fear of disease recurrence, the case presented here revealed that it is important for the consulting physicians to inquire the patients regarding TIAP removal to prevent any long-term complication of the TIAP.[1]

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Ferdi Çay, Gonca Eldem, Bora Peynircioğlu;* ***Design:*** *Ferdi Çay, Gonca Eldem, Bora Peynircioğlu;* ***Control/Supervision:*** *Ferdi Çay, Gonca Eldem, Bora Peynircioğlu;* ***Data Collection and/or Processing:*** *Ferdi Çay, Gonca Eldem, Bora Peynircioğlu;* ***Analysis and/or Interpretation:*** *Ferdi Çay;* ***Literature Review:*** *Ferdi Çay;* ***Writing the Article:*** *Ferdi Çay;* ***Critical Review:*** *Ferdi Çay, Gonca Eldem, Bora Peynircioğlu.*

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