Totally implanted central venous access ports (TIAPs) are reported to be 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
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. 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. 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. 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. Therefore, it is reasonable, in cancer patients with low recurrence risk, to remove the TIAPs as soon as the treatment is completed.
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**

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