Case report

Foreign body venous transmigration to the heart

H. LIU1,2*, Y.-H. JUAN2,3*, Q. WANG1, Y.-C. LIN3, C. LIANG1, X. ZHANG4, T. CAI2 and S.S. SABOO2

From the 1Department of Radiology, Guangdong General Hospital, Guangdong Academy of Medical Sciences, GuangZhou, GuangDong, China, 2Cardiovascular Imaging Program, Department of Medicine (Division of Cardiovascular Medicine) and Radiology, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA, 3Department of Medical Imaging and Intervention, Chang Gung Memorial Hospital, Linkou and Chang Gung University, Taoyuan, Taiwan and 4Department of Cardiovascular Surgery, Guangdong General Hospital, Guangdong Academy of Medical Sciences, GuangZhou, GuangDong, China

Address correspondence to H. Liu, Department of Radiology, Guangdong General Hospital, Guangdong Academy of Medical Sciences, No. 106, Zhongshan 2 Rd, Guangzhou, China. email: liuhuijiujiu@gmail.com

*Both H. Liu and Y.H. Juan contributed equally to this manuscript and are shared first authors.

Learning Point for Clinicians

Despite its rarity, foreign body lodging into the major peripheral vein due to trauma can travel to central vein and even to the heart. Progressive proximal movement of foreign body should alert clinicians of the possibility of foreign body migration in the vein.

Case presentation

A 35-year-old metal worker presented to a rural hospital with piercing injury to his right upper arm from a piece of metal. Plain radiograph of the right arm was arranged and revealed a metallic foreign body slightly proximal to the site of injury (Figure 1A). He was transferred to a secondary care hospital where a follow-up plain radiograph of the right arm surprisingly revealed cranial migration of the metallic foreign body into the right axillary region (Figure 1B). Hence, patient was then transferred to our tertiary care hospital for retrieval of foreign body.

After patient’s arrival to our institution 2 days after the initial injury, frontal chest radiograph revealed no foreign body in his upper arm or axilla but over the right cardiac silhouette (Figure 1C). A multi-detector CT of the chest confirmed the location of foreign body in the right ventricular cavity (Figure 1D and E). Open-heart surgery was preferred over endovascular retrieval of the sharp metal because of risk of potentiating injury to the heart and central veins during endovascular retrieval. However, patient refused for any surgical intervention of the heart due to associated risks with this major procedure.
Figure 1. Multi-panel image demonstrating the sequential changes of metal location over time. (A) Initial plain radiograph of the right upper arm taken at the rural hospital reveals slight cranial migration of the foreign body from the original site of injury (arrow). (B) Plain radiograph of the right upper arm taken 1 day later at the secondary care hospital reveals further cranial migration of the metallic foreign body to the axillary region (arrow). (C) Frontal chest radiograph demonstrates metallic foreign body over the right cardiac silhouette, possibly intra-cardiac. Coronal (D) and sagittal (E) reformatted images of the CT confirm metallic foreign body to be lodged in the right ventricular cavity. Follow-up frontal chest radiograph at 1 year (F) confirms unchanged location of the metallic foreign body in the right ventricle as before (C).
and remained asymptomatic on discharge. Follow-up frontal chest radiograph performed after 1 year (Figure 1F) of injury still revealed stationary location of the foreign body.

Discussion

The vast majority of intra-vascular foreign bodies is due to iatrogenic causes, which include fractured catheter, dislodged guidewire or stent,\(^2\) whereas foreign body lodging into the major peripheral vein and travelling to central vein due to trauma are rarely reported.\(^1\) To the best of the authors’ knowledge, none of the previous reports documented on imaging the sequential migration of foreign body from the major vein to the right heart.

The treatment of retained intra-cardiac foreign body has always been controversial owing to limited evidence-based literature;\(^2,^3\) though endovascular treatment is generally suggested, the choice among endovascular treatment, open-heart surgery or close observation is often based on the shape, size and location of the foreign bodies.\(^3\) Smooth-edged intra-cardiac foreign body can be conservatively treated, but retained sharped-edged foreign body can also remain asymptomatic for years.\(^4\) Open-heart surgery seems to be a reasonable solution, but not every patient can accept the risks involved. Our reported case supports this finding in that the completely unchanged location of the metallic foreign body in the right heart during serial follow-ups, which suggests complete fixation of the metallic foreign body to the inferior cavity wall by fibrous capsule, and further removal may not be necessary.

Conclusion

Despite its rarity, foreign body lodging into the major peripheral vein due to trauma can travel to central vein and even to the heart. Progressive proximal movement of foreign body should alert clinicians of the possibility of foreign body migration in the vein and arrange endovascular retrieval as soon as possible. When foreign body reaches the heart, the choice among endovascular treatment, open-heart surgery or close observation is often based on the shape, size and location of the foreign bodies.

Conflict of interest: None declared.

References