

# Metal Foreign Bodies Have Been in the Lungs for Five Years: a Case Report

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## Research Article

**Keywords:** Foreign body migration, Pulmonary artery, Lung

**Posted Date:** June 2nd, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-554998/v1>

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# Abstract

**Background:** Metallic foreign body migration into the pulmonary artery after limb trauma is extremely rare. If not treated in time, the patient may die. The metallic foreign body was implanted from the thigh into the pulmonary artery and remained for 5 years. It has never been reported in limb trauma.

**Case Presentation:** The patient was a 51-year-old male who had a small metal foreign body embedded in the middle and lower left thigh due to trauma. The foreign body was not found during emergency debridement operation. During the operation, a full-body X-ray was used to reveal a high-density shadow in the left upper lung. The 3D-CT of the chest immediately confirmed that the high-density shadow was a small iron foreign body, and the iron fragment foreign body was present in the pulmonary artery branch, but no abnormal symptoms were observed. He was hospitalized for observation for 3 days without obvious discomfort and refused to open his chest. The patient then decided to leave the hospital voluntarily.

**Conclusion:** Surgical removal of all foreign bodies traveling to the pulmonary artery is not necessary, and the most appropriate treatment plan should be made considering the location of the foreign body, the patient's wishes and the general condition.

## Background

In daily life, metal foreign bodies caused by limb injuries are more common, and it is rare for small pieces of iron to break through the blood vessel wall, fall into the blood vessel and travel to the pulmonary artery. Foreign bodies that migrate into the lung may cause sepsis, endocarditis, pulmonary embolism and other serious complications, which should be paid attention to [1]. We report a case of a metallic foreign body from the left thigh transplanted into the lung for 5 years without further displacement and without any symptoms.

## Case Report

A 51-year-old blacksmith accidentally got a metal object splashed into the lower thigh of his left thigh five years ago. This is an iron shard inserted into the skin. X-ray revealed an iron chip in his thigh (Fig. 1, panel A), but it was not detected during the debridement. After the surgery, some mild symptoms of chest tightness happened to him. Subsequently, the whole body X-ray was applied to look for this iron chip and to demonstrate if it shifted to other place. Most interestingly, chest X-ray disclosed a highlight point in the left upper lung (Fig. 1, panel B), which may be the iron shard transmitting from left thigh through arteries. Chest computed tomography and 3D imaging of pulmonary artery was used to confirm this inference and identified a similar iron fragment in the branch of the left pulmonary artery (Fig. 2, panel C and D). Although the iron chip still existed in the branch of artery, no abnormal symptoms were observed. After three days of observation in the hospital, there was no obvious discomfort and he refused thoracotomy. Subsequently, the patient decided to be discharged automatically.

## Discussion

Based on the clinical and X-ray findings, this patient has the following characteristics: First, the metal foreign body is 0.8 \* 0.4 cm in the patient's thigh, and the foreign body travels to the pulmonary artery through the blood circulation. There are similar reports in the literature, most of which are shrapnel plugs, filter plugs, stents falling off, etc. [2, 3]. However, there has been no report of the case where the iron tablets in this case remained in the body for five years without any complications. Second, the position of the foreign body in the blood vessel changes rapidly. We believe that it may be related to the following factors: foreign bodies may cause the blood flow to change from laminar flow to turbulent or turbulent flow; pulmonary artery blood pressure decreases during diastole, and the blood flow pressure at the distal end of the vessel may be greater than that at the proximal end; body position changes and the effect of gravity.

Treatment experience: For any metal foreign body that is close to the blood vessels of the extremities or damaged blood vessels, before the foreign body is removed by debridement operation, the blood vessels of the affected limb should be checked with color Doppler ultrasound and CT imaging to clarify the relationship between the foreign body and the surrounding blood vessels; On the basis of the use of tourniquets, perform foreign body and blood vessel exploration, and reduce the rubbing of local tissues to prevent small foreign bodies from infiltrating the bloodstream; if foreign bodies are not found during the debridement during the operation, the patient should be less moved when the foreign body is suspected to be migrating and the operation should be terminated and ask the interventional department and cardiac surgery to consult, perform interventional surgery to remove the foreign body or install a filter or tennis sac to prevent the foreign body from further migrating; on the basis of installing the filter, it is transferred to the higher-level hospital, and the blood pressure should be actively controlled on the way to reduce the patient's movement. If the location of the foreign body is deep, but the patient is in good condition, he can be discharged after a few days of observation with anti-infection and anticoagulation treatment, and return to the hospital regularly for follow-up after discharge. If the patient is in poor condition and the blood draw index is abnormal, the foreign body should be removed by thoracotomy as soon as possible.

## Conclusion

Surgical removal of all foreign bodies traveling to the pulmonary artery is not necessary, and the most appropriate treatment plan should be made considering the location of the foreign body, the patient's wishes and the general condition.

## Abbreviations

3D-CT: Three dimensional CT imagin; FBM: Foreign-Body Migration

## Declarations

## Acknowledgements

Not applicable.

## Authors' contributions

YL provided the clinical data included in the text. YL and JCL participated in the treatment decisions. YL wrote the manuscript draft. JCL and YL revised the manuscript critically and approved the modified text. JCL and ZL approved the final version of the manuscript. All the authors read and approved the final manuscript.

## Funding

This research is supported by the Cooperation program between Sichuan University and Luzhou municipal people's government (No. 2019cdlz-17). The funders played no role in the collection, analysis and interpretation of data or preparation of the manuscript.

## Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

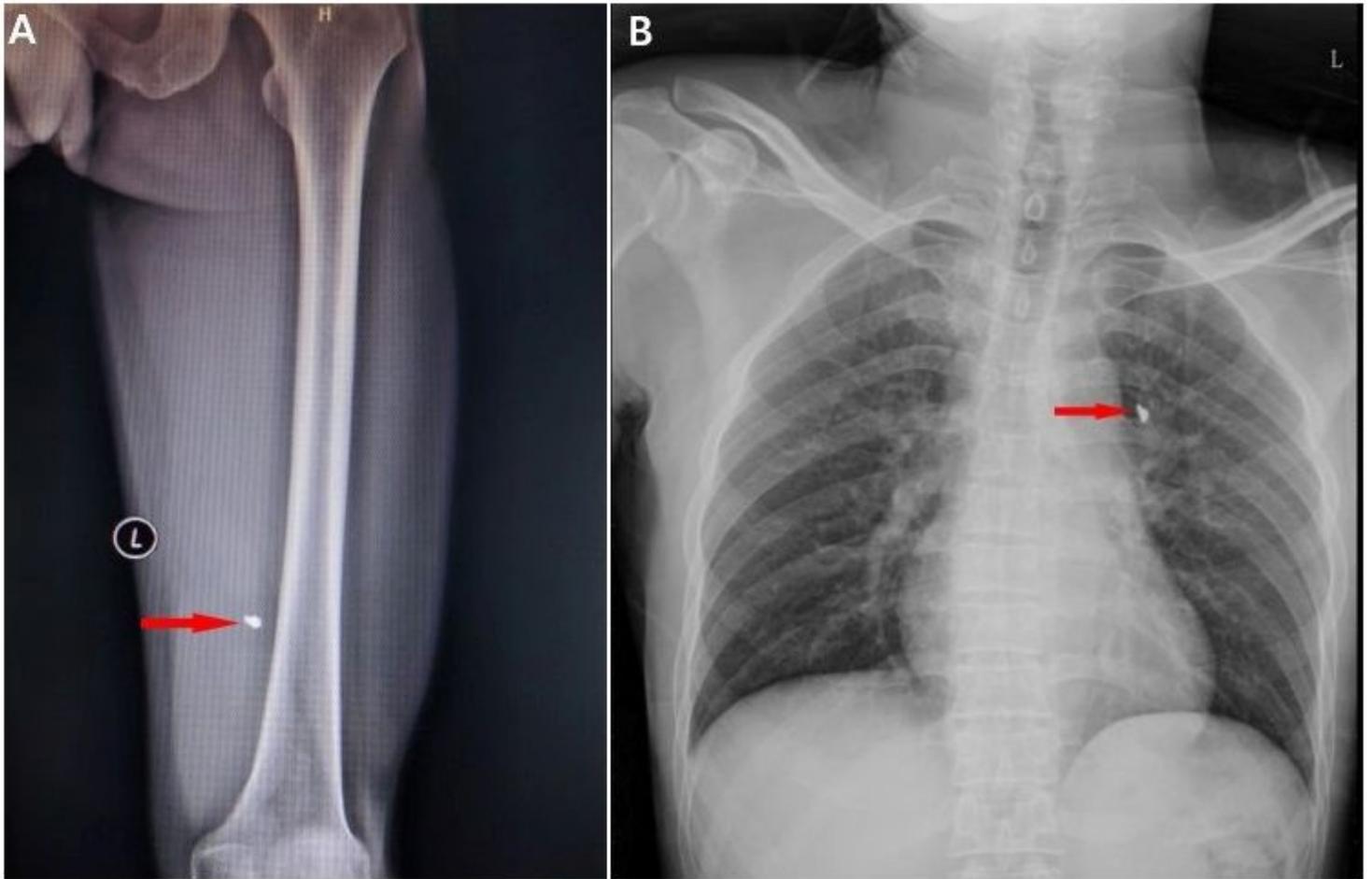
## Competing interests

The authors declare that they have no competing interests.

## References

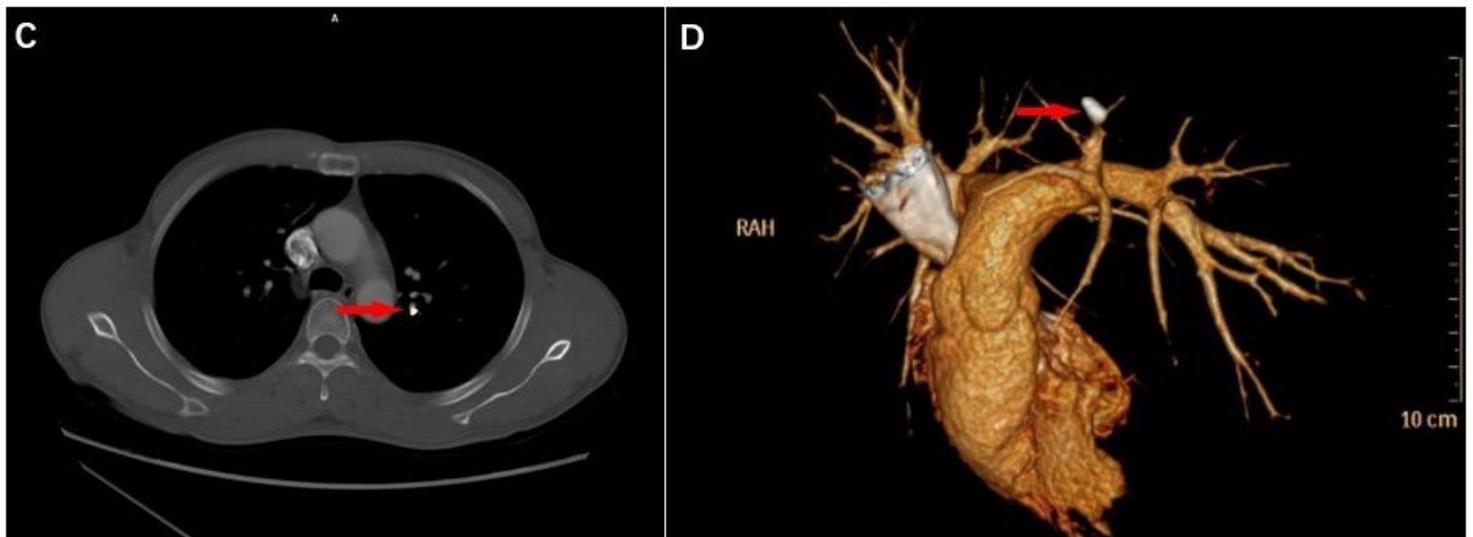
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# Figures



**Figure 1**

A. X-ray showing the iron shard in thigh (red arrow). B. chest X-ray showing the iron shard transmitting to left upper lung (red arrow).



## Figure 2

C. CT scan showing the iron shard in lung (red arrow). D. 3D imaging showing the iron shard existing in the branch of artery (red arrow).

## Supplementary Files

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