A 44-year-old man was referred to our hospital with a nail gun-induced penetrating cardiac injury. Haemodynamic status was stable, and a non-bleeding pinhole scar was located at the anterior chest wall (Panel A, white arrow). Chest X-ray revealed a nail in the heart (Panel B, red arrow). Computed tomography revealed that the nail head was lodged in the ventricular septum and that tip of the nail appeared to touch the anterior mitral leaflet via the left ventricular outflow tract (Panel C). Preoperative transoesophageal echocardiography revealed that there was no ventricular shunt or mitral regurgitation due to mitral valve perforation (Panels D and E, and Supplementary material online, Movie S1).

We performed a median sternotomy and there was no obvious bleeding point (Panel F). A cardiopulmonary bypass was established, and we examined the right ventricle through a pulmonary arteriotomy on the beating heart. We detected the nailhead and removed it (Panel G and Supplementary material online, Movie S2). Intraoperative transoesophageal echocardiography revealed that there was no ventricular shunt but new mitral regurgitation due to mitral valve perforation caused by the removal of the nail (Panel H, blue arrow and Supplementary material online, Movie S3). After cardioplegic arrest, we repaired the anterior mitral leaflet (Panel I). On gross examination of the removed nail, the length was 3.5 cm and the thickness was approximately uniform except for the nailhead (Panel J).

Because penetrating cardiac injuries are fatal, clinical imaging which is necessary to evaluate the heart and associated mediastinal structures have not been well documented. This case highlights the nail gun-induced penetrating cardiac injury through various clinical images.

Supplementary material is available at European Heart Journal online.