

Quantitative Reporting in Short-Interval Chest Radiographs for Critically Ill Patients with an Intra-aortic Balloon Pump

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Background

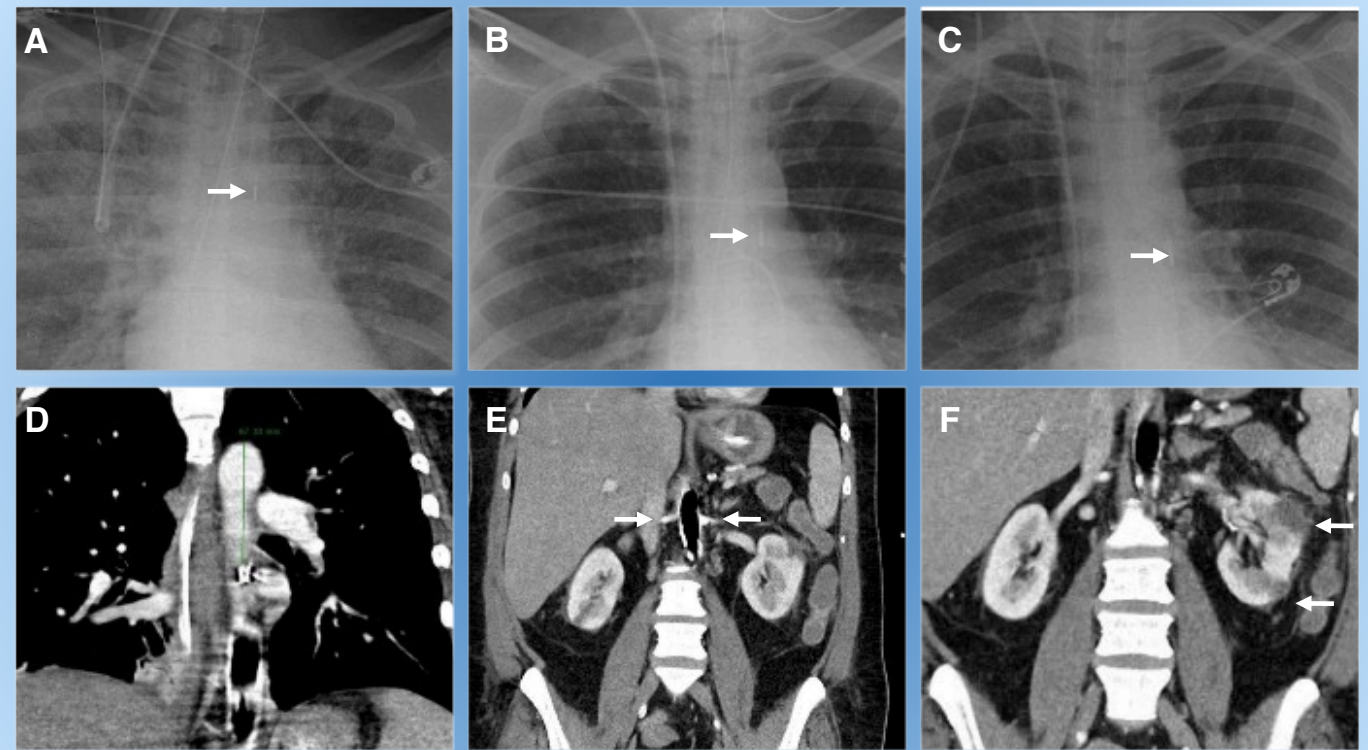
The 2022 ACR–SPR–STR Practice Parameter for the Performance of Chest Radiography suggests a role for short-interval chest radiographs in monitoring patients with life-support devices. It also advises limiting use in patients without clinical change or device migration. Short-interval imaging is critical to IABP safety, as malposition is significantly linked to adverse events.

Case Report

A 54-year-old female with subclavian artery stenosis, hypertension, and prior cardiac arrest presented with acute left chest pain and dyspnea to an outside emergency department. She was found to have NSTEMI and promptly underwent left circumflex balloon angioplasty. However, the patient decompensated with respiratory failure and shock physiology and was treated with an intra-aortic balloon pump (IABP) and mechanical ventilation. She was then transferred to a tertiary care center.

Definitive surgical CABG was deferred for medical optimization.

The patient was monitored with daily chest radiographs while she remained in critical care. Upon multiday retrospective review, the patient's IABP gradually migrated caudally; however, this movement was not quantified. Concurrently, the patient developed leukocytosis and fever on admission day 4, motivating CT investigation for a source of fever. Cross-sectional imaging revealed the balloon tip 7 cm below the superior wall of the aortic arch. The inferior portion of the balloon occluded the renal arteries, causing renal ischemia.



(A–C) Position of IABP tip on Day 0 (A), at 4th intercostal space. (B) is from Day 2, (C) is from Day 5. Caudal migration is noted to the 7th rib. (D) and (E) CT showing balloon tip approximately 7 cm of the aortic arch and inferior to the renal artery ostia. (F) Left renal infarcts are indicated.

Conclusion

We propose the standardization of IABP tip localization reporting in relation to surrounding anatomic landmarks (vertebral level versus distance from the aortic arch) and stress the importance of reference cross-sectional imaging. Furthermore, we reiterate the role of cross-sectional imaging to delineate aberrant patient anatomy poorly seen on plain film, as short distances between subclavian and visceral vessels can lead to inadvertent occlusion by the IABP and resultant infarction. This supports a role of CT in precise evaluation of IABP placement; however, increased radiation exposure and cost are relevant and important concerns.