Editorial comment

Fluoroscopic guidance is mandatory to insert intra-aortic balloon pump!(?)

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Intra-aortic balloon pump (IABP) is probably the most commonly used device to assist circulation. It has a wide range of applications in the setting of severe left ventricular dysfunction (e.g. acute ischemic syndromes or myocarditis), to provide hemodynamic support to high-risk patients during or after cardiac catheterization and percutaneous coronary interventions, and in the perioperative phase of cardiac surgery.

The IABP catheter is usually inserted percutaneously via the femoral artery using fluoroscopy, but a blind technique is also possible. In the latter approach chest X-ray is performed to confirm the correct position of the catheter, usually by means of portable equipments, using non-standard projections at variable quality levels.

Tip positioning is crucial to minimize arterial damage and to maximize hemodynamic effect. The orthodox site corresponds to the descending aorta, 1-2 cm distal to the subclavian artery: if catheter position is too low, the flow in the renal arteries may be compromised and a narrow abdominal aorta damaged. Conversely, if catheter position is too high, it may bend in the aortic arch and compromise epiaortic vessels and the aortic intima. In both cases optimal balloon inflation is prevented and efficacy of the device is reduced[1].

In this issue of the *Italian Heart Journal*, Totaro et al.[2] present a case where a new IABP catheter (Fidelity, Datascope Corp., Fairfield, NJ, USA) was used to support circulation in an 84-year-old female on postoperative day 1 after urgent aortic valve replacement and coronary artery bypass grafting. They used the bedside blind technique, measured the catheter length before insertion but, at control chest X-ray there was no evidence of the catheter tip. They decided to repeat chest X-ray after minimal displacement of the catheter and then the tip was easily identified in the right position. The authors conclude that, despite the effective more radio-opacity of the tip of the Fidelity catheter, it can be easily missed at plain chest X-ray, because central lumen is not radio-opaque.

If one examines carefully figure 1, it is clear that film is not properly exposed (only one sternal stitch is visible) avoiding the detection of the catheter due to superimposition of the spine. Moreover, tip movement during X-ray "snap" might put it out of focus. We do not think that a radio-opaque central lumen might improve its visibility. In figure 2, film exposure is more appropriate (it also seems to have a slightly different angulation) and the catheter tip is readily seen in the correct position. We do not know how long did it take to have the first and the second chest X-ray, but in some hospitals this procedure may be time-consuming. What to think if a third X-ray is needed to decide if a procedure performed on urgent basis is correct?

All these problems may be overcome if IABP catheters are positioned under fluoroscopic guidance, even if a low-performing portable system is used. Fluoroscopy also allows an easy repositioning in case of displacement, which frequently occurs using the thin and flexible (7F) last generation IABP catheter. But this is not all. In the case described by Totaro et al., no difficulties were encountered in performing the blind insertion in an 84-year-old female, but may not hold true for all elderly patients. In one study[3], female gender, high age and peripheral vascular disease were independent predictors of a serious complication. Elderly subjects usually have more atherosclerotic plaques, greater

vessel tortuosity and often smaller stature: a blind procedure may not always be feasible in these settings, wire insertion can easily cause vascular complications and cannulation of the subclavian artery is not uncommon.

Portable fluoroscopic systems are easy to use and should be available in all intensive care units. In case of financial constraints, a departmental use is possible and transport takes probably no longer than awaiting for plain X-ray.

References

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