

as a self-snugging vena caval cannula to facilitate the repair of an inferior vena cava laceration, to trip the mitral valve prosthesis for deairing during mitral valve repair, and as an intraluminal aortic-clamp in situations where cross-clamping the aorta would be hazardous (e.g. porcelain aorta).

Conflict of interest: none declared.

References

- [1] Gandolfo F, Filippelli S, Cetrano E, Carotti A. Managing major vessel injuries with a Fogarty catheter during chest re-opening in children. *Interact CardioVasc Thorac Surg* 2013;17:216–18.
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eComment. Efforts to further enhance the safety of sternal re-opening in the paediatric age group

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We thank Gandolfo *et al.* for their effective and easy reproducible technique for managing major vessel injuries during chest re-entry in children [1].

As diagnostic and therapeutic interventions in congenital heart diseases advance progressively, cardiac surgeons have begun to deal with chest re-opening more frequently. Although major venous damages like innominate vein can be managed by a Fogarty catheter, cardiac surgeons are still facing challenging problems, such as damage of cardiac chambers, retrosternal right ventricle to pulmonary artery conduits and ascending aortic aneurysms during the re-sternotomy procedures performed in children. In such cases, we believe that the inflation of Fogarty catheters may even enlarge the defect and make it more uncontrollable in an incomplete sternotomy.

In our practice, patients with a sternotomy history are carefully evaluated before the operation. Although the best option in imaging work-up is computed tomography, its routine usage is avoided so as not to increase the exposure of ionizing radiation in the paediatric age group. In most of the patients with redo cardiac surgery, magnetic resonance angiography or lateral projection of cardiac cine-angiography studies demonstrate the potential adhesions of the anatomic structures to the posterior part of the sternum. At the operation, we regularly mark the femoral vessels with Doppler ultrasonography and prepare a cardiopulmonary bypass (CPB) set-up before initiating the incision. The skin incision is performed subsequently, the sternal wires are untwisted and an oscillating saw is used to open the anterior table of the sternum until contact with the sternal wires at the posterior side is felt. The untwisted wires are held with clamps and the sides of the sternum are pulled upwards in which a lateral retraction force is strictly avoided. Afterwards, the posterior table of the sternum is carefully opened starting with xiphoid process towards the jugular fossa with the aid of Mayo scissors. We believe hyperinflation of the lungs, which decompresses the right atrium and ventricle, is a safe and easy measure during this part of the re-entry process [2]. We neither use electrocautery nor blunt digital manipulation for the dissection of the mediastinum.

As described by Holst *et al.* we can clinically group cardiac injuries during sternal re-entry procedures into two categories [3]. A cardiac injury in re-sternotomy is an anticipated (i.e. expected) injury when there is a conduit, an aortic aneurysm, an enlarged right atrium or ventricle which is adherent to the posterior surface of the sternum. In such cases, we prefer to initiate CPB with femoral arterial and venous

cannulation before sternal re-entry. This provides us with a safer re-entry process in the mediastinum with decompressed cardiac chambers. The main disadvantage of initiating CPB at the early stage of surgery is the prolonged duration of CPB and uneasiness of controlling the haemostasis in a heparinized patient. CPB may be discontinued after the safe entry to the mediastinum and dissection may be completed off-pump in order to shorten the CPB time. In unanticipated injuries, when a massive bleeding occurs, we discontinue the re-sternotomy and join the two sides of the sternum with two towel clamps. The femoral artery and vein are then promptly cannulated before further dissection at the mediastinum after which CPB is initiated.

As a result, besides meticulous surgical technique and judicious usage of CPB, we believe that simple and easily applicable precautions can decrease the incidence of cardiac injuries being encountered during sternal re-opening procedures. These precautions will obviously stipulate a prudent, safe and bloodless operative field for the surgical team.

Conflict of interest: none declared.

References

- [1] Gandolfo F, Filippelli S, Cetrano E, Carotti A. Managing major vessel injuries with a Fogarty catheter during chest re-opening in children. *Interact CardioVasc Thorac Surg* 2013;17:216–18.
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eReply. Re: Efforts to further enhance the safety of sternal re-opening in the paediatric age group

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We thank the author for his comments [1] regarding our report [2]. We must say that the technique for chest re-entry he describes is very similar to what we do in our institution, as well as the judicious use of preventive femoral cannulation in selected cases. We think that the technique of haemostasis with inflation of a Fogarty catheter may be, as the saying goes, one more weapon in the arsenal of the paediatric cardiac surgeon and as such, it has been reported.

Conflict of Interest: none declared.

References

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