Smart Placement of a Mediastinal Drain in a Neonate Who Requires a Postoperative Open Sternum

Phan-Kiet Tran, MD, PhD, Camilla Olin, RN, Madeleine Mentz-Karlsson, RN, Torsten Malm, MD, PhD, Jens Johansson-Ramgren, MD, and Sune Johansson, MD

Department of Paediatric Cardiac Surgery, Skane University Hospital, Lund, Sweden

Crowding of the mediastinum after complex cardiac repair procedures in neonates and young children is a frequent problem. To create space, the sternal wound is kept open, commonly with a plastic stent, for later closure. Despite this maneuver, space is still an issue, and appropriate placement of the mediastinal drain can become a challenge. In this article we describe a simple and effective way to eliminate the problem. Holes are made in the sternal stent, and the drain is pulled through these holes. The drain is elevated away from the heart surface and does not contribute to the crowding.

Immediate sternal closure after lengthy complex cardiac repair procedures in neonates and younger children may result in severe hemodynamic destabilization. The increased volume due to edema in the myocardium and lung results in crowding of the mediastinal space, which may cause symptoms of atypical tamponade [1]. The solution is to keep the sternal wound open for delayed closure on the next day or later.

Technique

A simple but clever technique described by Shore and colleagues [1] is to tailor one or two plastic tubes that can be sutured to the sternal bone and thereby keep the wound open (Fig 1A). We have used this strategy and have found it very useful; yet, we still have problems with placement of the mediastinal drain. We normally use a 16F drain for neonates. In the already crowded mediastinal space, this drain needs to be fixed in a position away from the heart and sensitive structures, such as the coronary arteries, or any sensitive atrium prone to arrhythmias.

To resolve this issue, we have begun to punch holes through the plastic sternal stent and insert the 16F drain through these holes (Fig 2). We see two immediate advantages: (1) the drain is fixed at a position away from sensitive structures of the heart, and (2) the drain is also elevated and leaves more space in the mediastinum (Fig 1B).

We use a 6-mm biopsy punch (Miltex, Inc, York, PA). For the sternal stent we cut a piece of a Mallinckrodt hi-contour cuffed oral/nasal tracheal tube, Murphy eye, internal diameter 7.0 mm (Covidien, Mansfield, MA). The drain we use is a 16F silicone thoracic catheter (Atrium Medical Corp, Hudson, NH) (Fig 2).

Comment

This technique of drain placement has not previously been encountered by any member of our surgical team, but this certainly does not mean that we are the first and

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Address correspondence to Dr Tran, Department of Paediatric Cardiac Surgery, Skane University Hospital, SE-222 41 Lund, Sweden; e-mail: kiet.tran@ki.se.
only. We would like to share this simple idea and hope that it may be found useful by many surgical colleagues who are working on complex heart repairs and who may have faced similar problems.

Reference