



Traction Technique (Rajesh Rao's) for Aortic Cannulation in Right Vertical Infra Axillary Thoracotomy

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Abstract

In minimally invasive cardiac surgery right vertical infra-axillary thoracotomy is one of the commonly used approach for repair of various congenital cardiac defects, valve repair or replacements, excision of myxomas. In this approach various cannulation strategies are followed depending on the patients profile and surgeon's convenience. Aortic cannulation is easier in children and few adults. However, in adults with BMI more than 30kg/m², aortic cannulation will difficult as aorta is far from thoracotomy. To bring aorta closer and stabilize, many surgeons apply long vascular clamps or right-angled forceps over epi aortic tissue. This not only compromises working space, also repeated application during cannulation and decannulation may cause injury. Here we describe a technique which is safe, atraumatic, do not compromise working space, brings aorta close and stabilizes the part of aorta during cannulation and decannulation. Overall, it provides a good control over aorta throughout the procedure.

Keywords: *Right Vertical Infra Axillary Thoracotomy; Aortic Cannulation; Minimally Invasive Cardiac Surgery.*

Introduction

Right Vertical Infra Axillary Thoracotomy (RVIAT) is an ideal approach for repair of congenital cardiac defects, valve repair or replacement and excision of myxomas. Various cannulation strategies are adopted.

- 1) Total peripheral cannulation (femoral artery, vein & internal jugular vein)
- 2) Total central cannulation (aorta, superior and inferior vena cava)
- 3) Partly central and partly peripheral.

Each cannulation strategy has its own advantages and disadvantages. Peripheral cannulation has disadvantages of retrograde perfusion and risk of limb ischemia especially when femoral arteries are small. Similarly in central cannulation working space is compromised due to the presence of multiple cannulae, in spite of excessive rib spreading. We follow a modified approach, where in central aortic cannulation and peripheral venous cannulation (femoral vein and right internal jugular vein) is done. This approach not only avoid risk of limb ischemia and retrograde perfusion also provide adequate working space with minimal rib spreading.

Technique

To have a good control over aorta (during cannulation and decannulation) also to bring aorta closer we follow a technique described by us as "TRACTION TECHNIQUE". We enter thorax through 3rd or 4th intercostal space, right lung is retracted with a wet sponge. After pericardiotomy multiple pericardial stay sutures are placed and heparinized. With a 4-0 or 5-0 polypropylene suture (with a soft pledget) a stitch is taken over the epi aortic tissue just above the aortic cannulation site and is passed through a free soft pledget and snared with a tourniquet (T1). Same step is repeated with another suture just below the site of aortic cannulation (T2). First assistant is instructed to apply a slight upward and outward traction on these tourniquets while taking purse string, during aortic cannulation and decannulation (**Figure 1**).

This technique is also used for placing cardioplegia needle. For this one more pledgeted 4-0 or 5-0 polypropylene suture is taken over the epi aortic tissue just below the planned site of cardioplegia needle and snared with a tourniquet (T3). Now first assistant is instructed to apply upward and outward traction T2 and T3 while taking purse string suture, during cannulation and decannulation of cardioplegia needle (**Figure 2**).

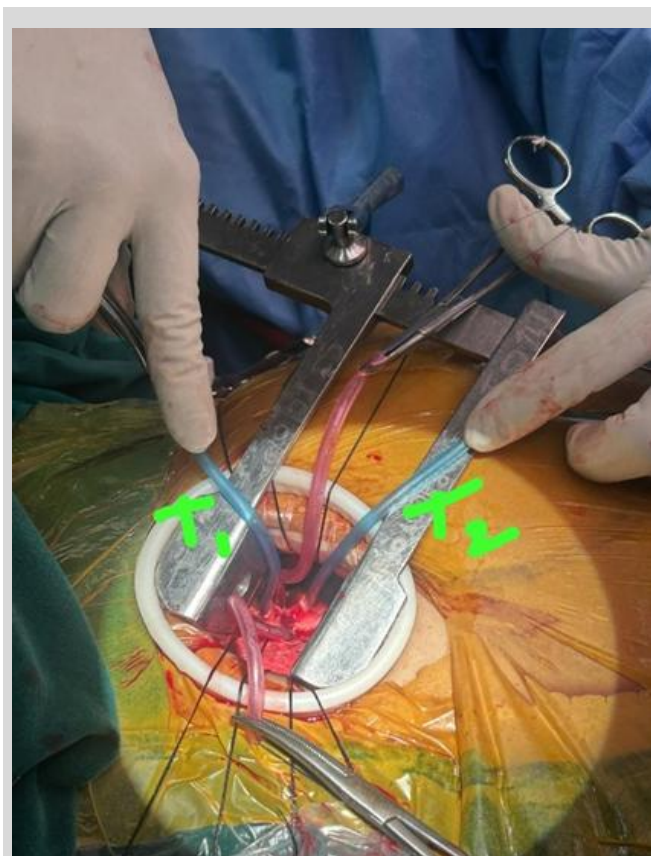


Figure 1: Intraoperative image showing traction on T1 and T2 bringing aorta closer before aortic cannulation

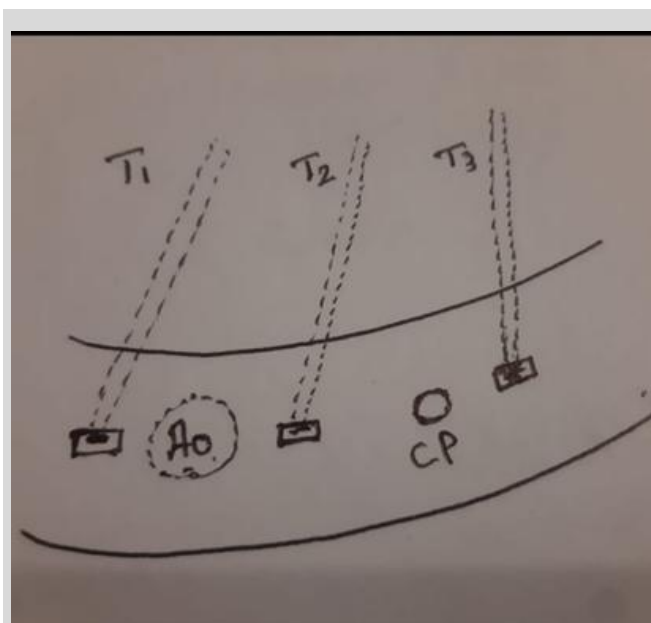


Figure 2: A: Aortic cannulation site - CP: Cardioplegia needle site; T1 & T2: Snared tourniquets just above and below the site of aortic cannulation; T2 & T3: Snared tourniquets just above and below the site of cardioplegia needle

Discussion

In right axillary thoracotomy (vertical or transverse) aortic cannulation is easier in children, however in adults especially when BMI is more than 30 KG/m² aortic cannulation will be difficult, as aorta lies far from the thoracotomy¹. Even though femoral arterial cannulation is convenient but central cannulation is more physiological (antegrade perfusion) and free from complications like dissection, embolization and limb ischemia. 2,3,4,5 Various

techniques have been described to stabilize and bring ascending aorta more closer to the surgeon, like grasping epi-aortic tissue by applying long vascular clamps or long artery forceps or right angled forceps and placing multiple pericardial stay sutures circumferentially 1,5,6,7 (stone hinge technique) These methods cause crowding of the operative field and clamps have to be removed after cannulation and reapplied, if required during decannulation. Excessive manipulation or traction may cause adventitial haematoma.

This technique is very useful in adults with BMI 30 kg/m². This technique not only brings aorta closer, also stabilizes the part of aorta during cannulation and decannulation, without compromising the working space. After aortic decannulation, sutures can be tied with fingers (without knot pusher) (Figure 3).

Initially we used this technique in adult patients with BMI more than 30kg/m², subsequently we started using this technique in all our patients (including children) undergoing various procedures through RVIAT.



Figure 3: After aortic decannulation sutures are tied with fingers (Upward and outward traction on T1 & T2 by 1st assistant)

Conclusion

This technique is safe, atraumatic, reproducible, working space is not compromised and after decannulation sutures can be tied with fingers (without knot pusher). We have used this technique in more than 550 patients safely without any complications.

Declarations

Funding Statement

None

Conflict of Interest

None to declare

Traction Technique

Traction technique described here, not only brings aorta closer to the surgeon, also stabilizes the part of aorta during cannulation and decannulation without compromising the working space. It is safe, atraumatic, and reproducible. We have used this technique for aortic cannulation safely in more than 550 cases.

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