

Introduction

In the evolving landscape of minimally invasive cardiac surgery, the peri-areolar approach has emerged as a promising gateway for achieving truly scarless endoscopic cardiac surgery. Traditionally, cardiac surgery is performed via median sternotomy, a method that, while effective, results in significant scarring, longer recovery times, and increased postoperative discomfort. Even conventional minimally invasive approaches, such as right mini-thoracotomy or partial sternotomy, often leave visible scars and carry the risk of musculoskeletal trauma. The peri-areolar approach offers a significant evolution by utilizing the natural pigmentation and curvature of the areola to conceal surgical entry, effectively achieving the goals of functional and aesthetic outcomes [1].

Aim

To highlight the peri-areolar approach as a novel, minimally invasive technique that enables scarless endoscopic cardiac surgery by leveraging the anatomical and aesthetic advantages of the areolar region, while maintaining surgical efficacy and minimizing musculoskeletal trauma.

Method

This technique involves using the patient's head as a reference of 12 o'clock and the patient's feet as 6 o'clock, an incision is made from 1 o'clock to 8 o'clock in an anti-clockwise direction to confine the incision to the upper lateral quadrant of the nipple [2]. Once the incision has been made, it is essential that the surgeon cuts straight down through the fat tissue and the pectoralis major muscle and is perpendicular to the chest wall. Failure to do so may result in a flap in the subcutaneous tissue. The formation of a flap may result in necrosis of the nipple due to damage of the nipple's blood supply, which arise from perforators found in fat and muscle tissue of the chest.

Once the incision is perpendicular to the chest wall, the surgeon must digitally palpate the intercostal spaces (ICS) to determine whether the incision should be made in the 3rd or 4th ICS. Typically procedures involving aortic valves are performed through the 3rd ICS and procedures involving mitral and tricuspid valves are performed through the 4th ICS [2]. Procedures involving multiple valves, are normally performed through an incision in the 3rd ICS. Once the appropriate ICS has been determined by the surgeon, an incision is then made to access the thoracic cavity. This is then followed by the placement of an Alexis soft tissue retractor.

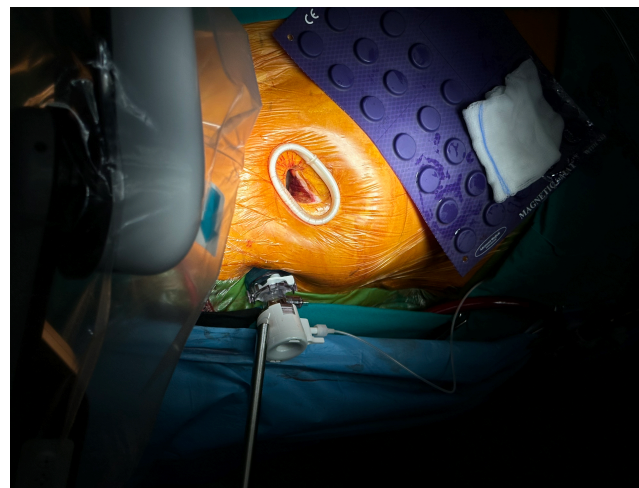


Figure 1: Peri-Areolar Incision in the 4th Intercostal space.



Figure 2: Mini-Thoracotomy in the 2nd Intercostal space.

Surgical Set Up

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Preparation is then made for the insertion of the camera port. The camera port is a 10mm incision made in the same ICS as the working incision [3]. Typically this incision is made along the anterior to mid-axillary line. The camera port facilitates the 3D 4K 30° Storz endoscopic camera system.

CO₂ may be introduced into the thoracic cavity via the camera port. This facilitates the surgeon to have less restrictions through the working port. The robotic arm is then put in place to facilitate the 3D 4K endoscopic camera, allowing the surgeon to have a hands-free visual while performing this complex procedure.

Conclusions

However, the peri-areolar approach is not without limitations. It requires experience in endoscopic cardiac surgery. Patient selection is critical—factors such as breast size, chest wall anatomy, and the type of cardiac pathology being treated influence the feasibility of this approach [4].