Building a transaxillary program in South America: lessons beyond the learning curve

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There comes a moment in every surgeon's career when knowledge is no longer enough. Reading papers, attending conferences and watching surgical videos eventually reaches their limit. Progress demands something far more uncomfortable: stepping outside your comfort zone and becoming a beginner again.

For many surgeons in South America, this is the reality of learning minimally invasive cardiac surgery. In Ecuador, our team began developing a transaxillary program in 2023. During my residency, exposure to minimally invasive techniques was extremely limited. Like many colleagues trained through conventional pathways, I learned cardiac surgery through median sternotomy. The challenge was therefore not simply adopting a new incision, but building an entirely new program without the benefit of a formal international minimally invasive fellowship. Looking back, I have realized that developing a transaxillary program is far less about technical ability than about changing the way an entire team thinks, prepares and works together.

One lesson became clear from the very beginning: a transaxillary program should never be built around a single enthusiastic surgeon. It must be built around an experienced team. Early in the learning curve, cardiopulmonary bypass and cross-clamp times will inevitably be longer. An experienced perfusionist becomes essential to maintain physiological stability, the anesthesiologist must anticipate the specific demands of prolonged minimally invasive procedures, and the intensive care team must understand the postoperative physiology. Scrub nurses also face a unique challenge because, unless a camera system is available, only the surgeon sees the operative field. Their ability to anticipate each step becomes fundamental. Experience—not age—is what matters. If everyone in the room is learning simultaneously, the learning curve becomes unnecessarily steep. Whenever possible, having an experienced senior surgeon available during the first cases provides invaluable judgment when unexpected situations arise.

The operation begins long before entering the operating room. The preoperative computed tomography (CT) scan is not simply another imaging study; it is the surgical roadmap. It determines the ideal intercostal space, estimates the distance from the

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skin to the valve, evaluates femoral vessel size for peripheral cannulation, identifies ascending aortic calcification or soft plaque, and anticipates anatomical challenges before they become operative problems. More importantly, it allows the surgeon to mentally perform the operation before making the first incision. Learning to interpret the CT scan from a surgical perspective became one of the most valuable skills our team developed.

Learning, however, extends far beyond imaging. Videos should not simply be watched; they should be dissected. Pause them repeatedly. Take notes. Study the exposure rather than only the valve. Observe where retractors are placed, how assistants apply traction, how instruments enter the chest and how experts recover exposure when it deteriorates. Ask yourself how difficult the procedure would become if a single maneuver were omitted. Technical mastery is built by understanding these seemingly insignificant details. Conferences provide inspiration, but conversations with experienced surgeons provide perspective. Whenever possible, visit reference centers and, even more importantly, invite experienced surgeons to your own institution. Several years ago, we had the privilege of hosting Professor Oleksander Babliak in Ecuador. His visit profoundly accelerated our program, not only because of the techniques he demonstrated, but because it transformed the way our entire team approached minimally invasive surgery. The same happened after visiting Professor Marco Di Eusanio in Italy; the insight and experience gained there continue to help us deliver better care for our patients. His work on minimally invasive transaxillary surgery has also demonstrated the importance of technical simplification and reproducibility in expanding these approaches (1-3).

Peripheral cannulation deserves the same respect as the intracardiac procedure. Surgeons beginning their experience should become comfortable with guidewire manipulation, femoral cannulation and vascular closure devices. If these skills are unfamiliar, partnering with experienced interventional cardiologists is a sign of good judgment rather than weakness. Our team developed one non-negotiable rule that has prevented countless problems: never advance a guidewire that does not move freely. The moment resistance is encountered is the moment to stop, reassess and understand why before proceeding. Many vascular complications begin by ignoring that simple principle.

One of the greatest surprises in developing a transaxillary program is that the steepest learning curve has little to do with the valve itself. Like many cardiac surgeons, my training provided extensive experience through median sternotomy but relatively limited exposure to elective thoracotomy. Learning tissue planes, accurately counting intercostal spaces and selecting the correct incision became essential skills. An incision one space too high or too low can transform a straightforward operation into a frustrating one. Once adequate exposure has been achieved, however, valve surgery remains valve surgery. The principles of repair and replacement do not change. The learning curve exists almost entirely before reaching the valve.

Perhaps the most valuable lesson our team learned was never to rush and never to skip seemingly small steps. In the early cases, there is always the temptation to save a few minutes. Ironically, those shortcuts almost always prolong the operation. Systematic pericardial stay sutures, meticulous exposure, complete mobilization of the ascending aorta before cross-clamping, thoughtful vent placement and careful retraction require little time but dramatically simplify everything that follows. Good exposure is not a

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luxury in transaxillary surgery—it is the operation itself. As experience grows, every team develops refinements that improve reproducibility. In our practice, advanced bipolar energy simplified pericardial opening, multifilament pledgeted sutures provided secure vent fixation, and automated knot-fastening devices reduced unnecessary technical complexity. These refinements never replace sound surgical principles; they simply allow the surgeon to focus on the valve rather than on the approach.

Every learning curve includes complications. Accepting this reality does not mean accepting preventable errors; it means respecting the complexity of adopting a new technique. Conversion to median sternotomy should never be considered a failure. It is sound surgical judgment. Patient safety must always come before pride, and every transaxillary procedure should begin with a sternotomy saw immediately available in the operating room. The objective is not to avoid conversion at all costs, but to recognize when conversion represents the safest decision for the patient. The learning curve should never belong to the patient—it belongs to the surgeon and the team.

Developing a transaxillary program in South America has taught us that excellence is never determined by geography. It is determined by preparation, mentorship, humility and relentless attention to detail. Every experienced surgeon carries invisible scars from the learning curve. Those scars are not failures; they are lessons, and our responsibility is to share them openly so that others do not have to learn them the hard way. Small incisions do not build great programs. Great attention to small details does. Ultimately, the true measure of a successful transaxillary program is not the size of the incision, but the ability to reproduce excellent outcomes safely, consistently and for the benefit of every patient.

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Footnote

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