Commentary: The Yin and Yang in Tetralogy of Fallot Surgery

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Central Message: Results after surgery for tetralogy of Fallot remain inconclusive as to whether preserving the pulmonary valve is advantageous. Right ventricular function studies will be able to answer that question.

Central Picture Legend: In Chinese philosophy, Yin and Yang represent dueling but intermingled opposite forces.

The present study (1) from the Royal Children’s Hospital in Melbourne is a solid study on tetralogy of Fallot (TOF) management over time. It spans 30 years, and comprises nearly 1000 patients with a median follow-up time of 10 years. Early and long-term survival is excellent. The trends they demonstrate, such as diminished used of trans annular patching (TAP) and of shunts over time, as well as operating on smaller and younger babies, are global in the western world at least. A total of 14 surgeons operated, which introduces a lot of variability, but still, since they all apparently used the same transatrial-transpulmonary approach, the cohort should be fairly tight. In addition, throughout the study period, symptomatic TOFs under 4 months of age received an aorto-pulmonary shunt.

In total, roughly 20% of all TOFs required reoperations, not counting any catheter-based percutaneous interventions. In a propensity-matched subgroup of 152 patients each, there was no difference in the reoperation rate between TAP vs pulmonary valve preserving (PVP) groups. While more pulmonary valve replacements (PVR) were done in the TAP group, this was offset by more reoperations for right ventricular outflow tract (RVOT) obstruction in the PVP group.

Some shortcomings are worth mentioning. Since the study starts with the actual intra cardiac repair for TOF, shunt deaths are not included and thus survival may be overestimated. The
pulmonary valve z scores were analyzed extensively, and reliance on its predictive ability is understandable, since it is a concrete number. However, this will skew the analysis since pulmonary valve morphology is also an important factor in whether it is salvageable or not. Granted, descriptors of pulmonary valve anatomy are almost impossible to obtain retrospectively. Finally, the conclusion, borne by the data, that an intraoperative postoperative peak gradient of more than 25 mmHg will almost certainly result in a future reoperation is hard to accept in isolation. Would the authors really go back on bypass and sacrifice the pulmonary valve if the measured gradient is 28, the RV function is good and the valve does not leak? I certainly wouldn’t and would take my chance with a re-operation down the line.

Taken in its totality, this study illustrates the “yin and yang” of current TOF management: patients with PVP had higher rates of repeat surgeries for RVOT obstruction, while patients with TAP had higher incidences of RV dilatation and need for PVR. The indications for PVR being fairly stringent in this cohort (as opposed to a US cohort for example), one could argue that the freedom from PVR is overestimated. A TAP is a permanent handicap which will invariably lead to a PVR, which itself will inevitably deteriorate and require further intervention. Either way, you still end up with a "pick your poison" scenario, but to me, a tilt towards PVP makes the most sense.

In the end, maybe we are all chasing the wrong thing. With such safe reoperations nowadays, maybe the aim shouldn't be to avoid any reoperation over a lifetime, but to aim for the best postoperative cardiac “milieu" (i.e. RV function) postop. While studies such as this one are highly instructive, only long-term MRI studies for RV function indices will truly begin to answer these questions.
References:
