Discussion to: Hybrid stage 1 palliation with simultaneous off-pump ventricular assist device placement in neonates with high-risk single ventricle anatomy: Initial experience

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Presenter: Dr Constantine D. Mavroudis

Dr Dr Iki Adachi (Houston, Tex). First, I would like to say thank you to the American Association for Thoracic Surgery for this opportunity as a discussant. Dr Mavroudis and his colleagues from Children’s Hospital of Philadelphia presented a very interesting case series of off-pump placement concomittant with hybrid stage 1 palliation in high-risk neonates with hypoplastic left heart syndrome. This report nicely demonstrates the technical feasibility of such an innovative procedure with good short-term outcomes. Congratulations on your success. I have couple of comments in the questions. The first is kind of philosophical: Simply speaking, do we really need to avoid the bypass? That’s the question. When the history of heart surgery started several decades ago, the bypass time needed to be very short because the bypass was not perfect. But that is not necessarily the case in the current era. This is particularly true when we operate on patients with heart failure because their physiology is very suboptimal. Actually, bypass improves their physiology. So, when I press back, I always tell my fellow, “Actually, the patient’s physiological resuscitation starts when we start bypass, not necessarily when we start the ventricular assist device (VAD).” Because the physiology gets better. So obviously, this high-risk patient has very suboptimal underlying circulation. When placing, for example, side-biting clamp on the main pulmonary artery, patient physiology will be even worse. That is obviously the cost of doing these types of procedures off-pump. So, the first question is, Do we really need to avoid bypass?

Dr Constantine D. Mavroudis (Philadelphia, Pa). Thank you very much, Dr Adachi, for that question. And I would just mainly say it’s kind of up to you. Because of our philosophy on this—and again, I think it’s very well put that you called it a philosophical question. Our philosophy here is that although these patients are very high-risk, we actually argue that is a reason to avoid cardiopulmonary bypass. Because although in the short term you’re improving their physiology by directly unloading everything, then you put in the VAD, and it sort of eases that transition. You do pay for that on the back end of it, and you pay for it in things like total body edema and pulmonary issues. I mean, all of the issues that we know so well from any of the first couple of chapters from any of our books. And just avoiding those potential issues that could ultimately increase your intensive care unit length of stay put patients at higher risk for intensive care unit-related morbidity and increases their ventilation time. All these things that can just get these kids in the postoperative period, that’s sort of our reasoning. And the second aspect of this is just trying to avoid as many blood products as possible. I’m not going to say that these are bloodless cases. Anyone who’s done these cases knows that things happen. But as evidenced by the fact that our panel-reactive antibodies were low, if any, in these cases, we do think that that’s helpful. These neonates, of course, would have to have a blood prime, and they’d have to be exposed to more and more products. So, although I agree with you that in the short-term, best transition to VAD physiology from hybrid physiology would be offloading with cardiopulmonary bypass, I think you pay for it on the back end.

Unidentified Speaker 1. Great. Thank you.

Dr Adachi. One more question I have about the use of the stent, patent ductus arteriosus stent. My disclosure is I hate stents.
Dr Mavroudis. I think everyone in this room would agree with that.

Dr Adachi. Different ways of placing the stent make the valve support easier and, probably, they improve the survival. But we need to pay attention not only to the short-term outcomes but also to the long-term outcomes after transplantation. I do not believe that placing the stent makes the best anatomical platform for future beautiful arch repair. That’s why I try to avoid this placing of a stent. And when I do this type of surgery, I use prostaglandin as a chemical hybrid.

Dr Mavroudis. Yeah. And again, these are debates that rage and will probably continue to rage for quite some time. But our philosophy on this is that every—I mean, you saw all these kids. They’re all the 3-plus-or-minus-a-little-bit kilos, incredibly unwell patients. And our goal is to try to get them not only to VAD but also ultimately get them to transplant. And I can’t point you to any particular study that can prove this to you fair and square, that a chemical hybrid versus a stented hybrid results in much better tissue quality in the stented hybrid versus the chemical hybrid, but the risks of long-term administration and exposure to prostaglandins is definitely the other side of that coin. And what we’ve found is it’s easier to work with a stented, kind of jacked-up aorta than it is to work with tissues that just fall apart. So, for better or worse, that’s our philosophy on it. I mean, I’m certainly not going to go toe to toe with you on this and say we’re right, but the big issue for us was the stent. The ductal stents, we’re just kind of used to that at this point because we’ve kind of lost that battle with the cardiologists. But this stent is a real pain. And that’s something that we’re now avoiding at all costs. If the arch is even sort of, kind of, we just put a side graft to it because we hate that.

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