undergoing surgery and added the ECMO event rate; we were unable to capture neurologic events that would be an important component of assessing morbidity. Our data set did not allow for examination of unplanned reintervention rates. Future studies, such as those using the linked Society of Thoracic Surgeons-PHIS database, that provide insight on these variables can further help with prioritization schemes. Finally, our data do not explain the reason for the significant variation in care for the various procedures. Perhaps center- or institution-specific features have some impact in this regard. These could be the subject of future investigations.

Our results have the following implications for QI efforts in pediatric cardiac surgery. First, the data might be used as a guide to prioritize local QI efforts at individual institutions based on their case mix.23 We have provided a number of “priority lists” based on various ranking algorithms; these can be modified as desired and provide a concept of which areas to focus on to implement QI measures. For professional organizations, our findings might be useful in targeting large-scale QI efforts beyond subjective, consensus opinion; other data sets can be used for validation of such schemes or to develop more robust prioritization schemes in an objective manner. Finally, our findings are relevant to current policy discussions regarding healthcare reform and associated costs as one may use similar approaches to identify high-leverage procedures, in terms of their potential for not only improving patient outcomes but also reducing excess cost.

Our study does not assess the extent to which QI could reduce any parameter for each procedure. Therefore, individual organizations and improvement teams would likely want to consider other factors in setting their QI priorities. In particular, it would be important to weight the potential of each procedure for a QI initiative, even though we tried to focus on the higher-volume procedures.

CONCLUSIONS

Future work should aim to improve our current understanding of processes of care associated with observed outcomes and objectively lead to QI initiatives that improve care across many institutions that currently care for children with congenital heart disease.

References


Discussion

Dr James Jagger (Aurora, Colo). As you describe, measurement of quality and performance in the management of our patients with congenital heart disease is challenging because of the vast variety of congenital defects, the variability of presentation, and the severity of illness. It makes it difficult for even complex analyses like this one to capture that. I do like your idea of a prioritization system, something that takes into account not only the mortality figures but also those areas that we know are problems (eg, reintervention, readmission). You use the PHIS database,
which is a powerful tool and is becoming increasingly used in our field. But it has important limitations as you described. It is retrospective and observational. It is fraught with coding errors, and it captures charges but not cost. It does have a lot of power advantages, so eventually efforts like this to improve our quality are going to take a combination of different databases, such as registries and the administrative databases. With that comment aside, I have a couple questions for you.

Why did you use the RACHS system in your prioritization rather than the more newly combined stratification system, the European Association for Cardio-Thoracic Surgery (EACTS)/Society of Thoracic Surgeons (STS)? One of the reasons you did this study seems to be because you did not like the consensus-based classification. Why not use a data-derived classification system like the EACTS-STS system?

Dr Eghtesady. Simplistically, because the RACHS is an easy algorithm that allows pulling procedures out of administrative databases based on International Classification of Diseases 9th Revision codes. You basically have to access the STS/EACTS database. There is no algorithm that you can apply to the administrative database to be able to pull that data, but I think one could do exactly the same thing with the STS database, which is ease of access to the PHIS database and being able to pull the data using the RACHS algorithm.

Dr Jaggers. Just by way of clarification, when you talk about LOS in your study, does that include the preoperative LOS or is this strictly postoperative LOS?

Dr Eghtesady. No, it is from admission to discharge, so there could be a period of preoperative stay included in that.

Dr Jaggers. That is an important distinction when we start comparing different databases and outcomes that are related to LOS. I am always a little skeptical about complication rates in the PHIS database. As you know, hospitals get reimbursed according to these diagnosis-related groups and the rates of complications. Is there any way within your study that you can reassure us that the complication rates are not significantly different between institutions and different payors?

Dr Eghtesady. Yes and no. You are absolutely right, and I am skeptical of them to some extent. With that said, just looking at ICU LOS, which others have shown to be a surrogate marker of complications, the data (ie, the prioritization and all that) still hold and correlated with the events rate that we saw, so even though we may be undercapturing the events and this is a derivation of a derivation, there is a lot of reach there if you will. I think the data you see are not necessarily inaccurate. I think the data are underrepresenting; we are not seeing all the complications that should be there. Additional effort needs to go into providing definitions. For example, neurologic events is missing, and specifically the reason is until 2010 the database, PHIS database, did not have a category to identify whether the child presenting at admission had a neurologic problem at baseline or not, so using the definitions that have been used in the past would have given us an unmeaningful response. The database includes select events and is not completely accurate, but my confidence lies in the fact that it correlates nicely with ICU LOS, which is a reasonable assumption to say it is a surrogate for complications.

Dr Jaggers. As you have described, the PHIS database’s advantage is that it contains more than 5 million inpatient encounters and with that comes charge data for which cost data can be derived. We are going to be judged on value essentially and quality and cost. What is your opinion as you look forward? Do you think it is time for us to start including cost within these prioritization screens? What do you think about that?

Dr Eghtesady. Great question, and the short answer is yes. I talked about it with Matt Hall, but the reality was for us to be able to pull that off was going to be challenging because it seemed like we had so much in there. You and Ross Ungerleider were kind enough to provide reference to me, an article that you guys had published a long time ago where you looked at costs at Duke with 140 procedures and looked at variation and how ASD repair was a reliable cost versus VSD, which was more variable. That is an important thing to look at, and in the future that would be one of the things that would definitely be worth looking at.

Dr Jaggers. Thank you.