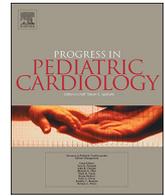




Contents lists available at ScienceDirect

Progress in Pediatric Cardiology

journal homepage: www.elsevier.com/locate/ppedcard

Editorial

Regional consolidation of pediatric cardiac surgery in New York State – Are we there yet? A destination reached or a step in the right direction?[☆]



Unnecessary patient harm occurs in all health systems, adding to health expenditure and raising political pressure for public accountability and improved governance. In pediatric cardiac surgery, harm can manifest in child suffering and morbidity, the need for additional care, longer-term disability and even death. Pediatric cardiac services planning mandates balancing the benefits of local access to pediatric cardiac surgery with the perceived benefits of larger case volume on system reliability and patient outcomes. Yet pediatric cardiac surgery across the globe did not develop in alignment with such planning principles. The literature from the current era favors sites with large case volumes [1–3] often mandating large travel distances, imposing significant burdens on parents and potentially disrupting local and regional networks and care pathways. Provision of pediatric cardiac surgery is also driven by market forces and demographic changes. Clinical microsystems consisting of talented individuals may provide broadly equivalent and reliable outcomes to those of large centers in selected patients at smaller sites.

New York State holds a special place internationally in the evolution of reliable and safe adult and pediatric cardiac surgery [4,5] as well as the patient safety movement [6]. Public acknowledgment of variation in mortality across numerous sites led to the first state-wide mandatory reporting of institutional outcomes and individual surgeon performance. These initiatives preceded the events of Bristol Heart Infirmary [7] that shaped planning and governance of pediatric cardiac services in the United Kingdom. The merits of public reporting continue to be debated across North America and beyond [8]. Public reporting bolsters clinical and administrative accountability and has been shown from other industries [9] to be the cornerstone of deep learning about complex systems and how best to get to system resilience [10].

The incredible legacy of mandated public reporting and state-wide record keeping has allowed Swartz et al. [11] to benchmark outcomes over many years to the remainder of surgical programs in NY state and provide contemporaneous comparisons across the two eras described, before and after macrosystem ‘regionalization’. Era-based comparisons raise legitimate questions but are essential and rarely available at this jurisdictional level. This is most clearly evident for high complexity lesions including hypoplastic left heart [12] over the last fifteen years but is also relevant to common lesions such as Tetralogy of Fallot where surgical approaches have changed dramatically, and lesion-based management continues to evolve as exemplified by ductal and right ventricular outflow stenting [13]. Service leaders who initiated the state-wide collection and reporting requirements must have faced

significant opprobrium as data-driven disruption challenged well established dogmas, programs and careers [14]. The fruits of their endeavors are now clear to see.

A reduction in peri-operative mortality and improvement in longer term outcomes have been well described by the authors [11] and attributed to a coalescence of three surgical sites into two, with the same cardiology service providing care in a networked arrangement at all three clinical sites. The ‘one network, two surgery sites, three hospitals’ model is an attractive concept. The seamless integration of care irrespective of the presenting site might be the biggest yet unmeasured reason that overall outcomes have improved. A deep culture of collegiality and collective purpose must be central to the effective management of the network. Understanding and attending to this backstory as to how this was created could inform other regions and nations struggling with a large number of low volume sites and the respective variation in outcomes. It would be good to know more about their change and operational management approaches including how they enabled trust and truth telling that supported transparent sharing of clinical protocols and outcome data across sites and co-operation that led to effective implementation [15].

There are a number of concerns about the model of care that require closer attention to details, particularly as it relates to the surgical workforce, the nature of team training and performance improvement, the financial and practical sustainability and external generalizability of such arrangements and the impact on non-cardiac services in this network. Admittedly, the focus of the comparison included only biventricular repairs and that the raw mortality described is neither the overall perioperative mortality nor a descriptor of the overall case load for the region as a whole, or for component programs. The authors have focused on infant biventricular repair because of the availability of era-based comparative data. Acknowledging this construct, it remains unclear the extent to which the surgical component of the network manages complex bi-ventricular work and single ventricle pathology and the extent to which these lesions are managed initially by referral to out of network cardiologists and surgeons, and whether referral back to the cardiologist of origin occurs. For the patient group described in the study (biventricular infant repairs), an annual volume of 87 cases per year is performed across two sites. The total case volume (older children and adolescents) is not described but is important in describing individual surgeon volumes and overall institutional volumes. If additional cases doubled the overall case load, then this volume would represent a surprisingly high workload for one surgeon working at two sites and possibly only just enough for two surgeons doing what is

[☆] The Authors declare there are no conflicts of interest.

currently considered a minimum adequate volume of pediatric cases [16,17].

This naturally leads to a discussion of how this model of surgical practice addresses or mitigates the usual characteristics of high performing microsystems providing care at all levels of complexity [18]. Such characteristics include engagement of high fraction or full time pediatric cardiac surgeons, surgical participation in daily multidisciplinary rounds at a predictable time, availability of suitably skilled senior surgical staff within 30 min at all times to provide support for post-operative patient care and catheter lab interventions and support the ability to provide ECMO support at short notice [19,20]. One to two surgeons across two surgical sites as described will be unable to provide this level of reliable support.

If such support is not considered to be required because of the lower complexity of the lesion or procedure planned, where does one draw the line and assert that full surgical support is not required for a particular patient or lesion? How good are we at predicting this on the basis of pre-operative clinical data? When are the services of a fully featured surgical service including advanced diagnostic services, genetics, psychology support and family care not required and what impact does their absence have on short and long term outcomes? How does this model support fully engaged families in supporting meaningful co-production of reliable and safe outcomes [21]?

The authors refer to the importance of the primary surgeon in achievement of these outcomes, presumably a reflection of both their technical proficiency and clinical decision-making but also in the stabilization of a multi-site service by imprinting a single consistent approach implying a focus on the quality and reliability of the non-technical skills used to deliver care [22]. The 'key-man' is both an asset and system liability in any organization, with the potential for complete loss of the service in the event of illness, accident, leadership challenges or recruitment away from the service [23]. Entrenchment of existing approaches, absence of daily safety management and peer review and support, all represent challenges to system resilience and sustainability. Furthermore, the authors mostly overlook the well documented data in cardiac surgery related to the training and contribution of other team members during and after the surgical repair, the key value of feedback on technical and non-technical skills and the importance of applying a human factors approach to refine team performance and achieve reliable and safe care [22,24].

There are few instances where institutions happily surrender their pediatric cardiac surgery program to another institution to build something better for overall patient care and this rarely happens without conflict. It is therefore a significant political and professional achievement described by the authors. More details would be helpful for those with similar challenges, and to avoid the messy and incomplete situation for example in the NHS where consolidation has led to great political turmoil [25]. A loss of pediatric cardiac surgery at a site may impact numerous related services with implications for training and accreditation in intensive care, anesthesia, provision of 'eCPR', concern about rare circumstances including major pediatric trauma and complications of oncology treatment. Importantly, the primary responsibility of a cardiac program is the cardiac patient and family. Retention of surgical services at a low volume site cannot be justified solely by the need to support inter-dependent services, with the potential for consequential patient harm and loss of community support.

The cardiac services leadership group must understand these issues and the need to provide an excellent cardiology service at non-surgical sites, with effective and seamless escalation to surgical sites as required. This raises thorny and unresolved questions around transport risk assessment, communication, coordination and hand-offs of care between organizations [26]. It is also incumbent on the larger site/s to effectively communicate progress and complications to physicians and nurses at the referring site in a way that seems difficult to achieve when relying just on the good nature of busy clinicians at each surgical site.

Similarly, frameworks for family transport, accommodation and support while away from home require resourcing and ongoing assessment.

The authors nicely describe the benefits of volume at the larger surgical site: 'our increased case volume stimulated program growth and the professional development of pediatric cardiac specialists in anesthesia, perfusion, nursing, and intensive care'. If program growth and recruitment of surgeons continues as planned, this regional approach could become a model that others might like to emulate. Steps to secure the buy-in of non-surgical sites and sites with smaller volumes are key and need to be addressed explicitly if we are to overcome the present barriers to achieving ultrasafe healthcare [27]. Nevertheless, having surgical units with different levels of care and capabilities makes it difficult for referring practitioners to have confidence in the service as a whole and referrals may naturally favor the larger unit over time, thus undermining the proposed model. This unintended consequence must be explicitly raised as it poses a significant danger to the network collegiality and overall trust and transparency.

We also need to consider the generational drivers of change, including the rise of practitioners who value time away from direct patient care, a greater engagement in their own family and non-work lives, including as a way to address the rampant burnout of providers, with those who choose to work sustainably and for longer [28]. Such aspirations are in direct conflict with the intensity of on-call rosters required of key practitioners managing multiple surgical sites.

Outsiders might then ask, with all the good work achieved in this region and the template established for full engagement with non-surgical sites, what value to patients and system efficiencies could be realized by further consolidation of this Network? More work is needed to better understand the required cultural and organisational change management and the financial implications of creating an effective and reliable consolidation for pediatric cardiac surgery regionalisation.

Declarations of Interest

Authors declare there are no conflicts of interest.

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