

Pediatric surgical care: have we done enough?

"The Doctor", a classical painting from the 19th century master Luke Fildes, depicts a physician at the bedside of a dying child with the parents as helpless onlookers. Any specialist that cares for children can immediately identify the mixed sense of anguish combined with a persistent, underlying drive for a cure and a passion to ease suffering. Few things unify people to the degree that is experienced in the care for a suffering child. The shifting paradigm away from individual efforts toward collaboration has resulted in rapid, greater advancements in the care of children in the past 20 years. The management of gastrointestinal pathology in children is no exception, with improved understanding of molecular mechanisms, biologic therapeutics and the advent of minimally invasive techniques. While some of these advances are extrapolated from adult data, others have arisen from the need for pediatric specific ailments. Understanding the differences in pathophysiology of a developing human is of paramount importance for these advancements.

A primary consideration in the surgical approach to pediatric patients is the size of the child. For open surgery, and even more so minimally invasive approaches, working space is dramatically decreased. Adding to the complexity is the limited selection of size specific devices for pediatric patients. Decreasing instrument component size raises a new set of engineering challenges that are hard to surmount, and the relative infrequency of pediatric disease processes makes economy of scale for production unrealistic. Consequently, pediatric device development is an industry abandoned by many companies.

All hope is not lost, however. The ever evolving need for decrease size of instruments in adults to minimize morbidity will indirectly impact the device development for children. This is perhaps best illustrated in the field of robotic surgery. The robotic platform makes complex movements easier and levels the playing field for surgeons with less inherent dexterity. The current robotic platforms are designed for adult patients, although pediatric surgical specialists have repurposed them in children. The quality of instruments has been refined, with 3 mm and 2 mm instruments that are sturdy and able to function like corresponding 5mm instruments. Resolution of optics significantly increased, and image enhancement technologies have been developed. Furthermore, smaller energy devices and mechanical staplers have been specifically designed for children. These improvements combined with advancements in operative techniques have improved the care of the pediatric surgical patient.

As is so often the case in medicine, necessity drives innovation. We can only hope that this trend will continue to evolve in the future. The goal continues to be earlier, non-invasive diagnostics with more effective interventions that minimize patient morbidity and maximize patient comfort.

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Page 2 of 2

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