New Horizon in Understanding of Pediatric Surgical Diseases

Over the last three decades, our understanding of various pediatric surgical diseases has changed enormously. It will be interesting to visit the changed scenario in relation to some of the common neonatal and pediatric surgical diseases.

In the late 80’s, with the popularisation of routine prenatal anomaly scans, many fetuses were diagnosed with pelvi-calycial system dilatation. However, we did not know how to deal with this problem. With time, we have set up few standards which help us to monitor and select patients for surgery.[1]

The results of surgery for pelvi-ureteric junction (PUJ) obstruction in children, is often a cause of worry to the pediatric surgeons because of unsatisfactory results of follow-up investigations in some of these cases.

We have realized that the establishment of a patent PUJ does not necessarily lead to the improvement of renal function.[2] The postoperative results of ultrasonography and isotope scans do depend on patent PUJ and the degree of renal dysplasia, but some other factors may also influence the outcome of the surgery. We have started pondering on ideas like the presence of pelvic pacemaker and presence of cells of Cajal, responsible for the flow of urine from the pelvis to ureter.[3,4]

In the seventies, the correct diagnosis of the posterior urethral valve was a challenge and treating it correctly was an even bigger challenge. With the availability of miniaturize cystoscopes and resectoscopes, we were able to remove the obstruction caused by the valve cusps. Follow-up of these patients taught us that only removal of the valve cusps does not necessarily mean preservation of renal function. The concept of valve bladder was introduced and the changed pathology of the urinary bladder was documented. The present aim of management is to provide the patient with a low-pressure compliant bladder (by medical or surgical means) which evacuates at low pressure. A persistent rhabdosphincter spasm at the bladder outlet may lead to a high-pressure bladder even after anatomical ablation of valve cusps. Ultrasound of kidney, ureter, bladder (KUB), magnetic resonance and urography, urodynamic study, and isotope scans are great tools which help in monitoring the anatomy of KUB renal functions.[5-7]

Our attempt at anatomical closure of bladder and sphincter to make an extrophy-epispadias patient continent may lead to a high-pressure bladder. Here also the ultimate aim of treatment for preservation of renal function is to provide a low-pressure compliant reservoir which can be emptied at intervals under low pressure. Clean intermittent catheterization is a valuable tool to achieve low-pressure evacuation in these patients as also in patients with neuropathic bladder.[8-10]

The idea of providing a wrap with tunica vaginalis or dartos muscle during urethroplasty is popular these days. The adoption of tubularized incised plate urethroplasty with a second layer of wrap has significantly reduced the incidence of complications such as urethral fistula and stenosis.[11,12] A glanuloplasty with properly mobilized glandular wings, has improved the aesthetic results of urethroplasty.

The aggressive approach toward assigning sex and doing corrective surgery for the treatment of disorder of sex development has changed. Maximum importance is given to cortical sex and cortical maturity of the patient while making decisions before any major surgery. Any mutilating surgery should be deferred and should only be done with the consent of the patient.[13,14]

Avoidance of sepsis, extrapleural approach, ventilatory and nutritional support were well established measures for achieving better results of surgery for esophageal atresia.[15] What came as a surprise is the undertaking of...
the forbidden act of extended mobilization of the distal esophagus by endoscopic surgeons for a tension-free anastomoses in long gap esophageal atresia. In these patients, long term follow-ups will validate the safety of the procedure.[16-18]

The study of the pathophysiology of patients of Congenital Diaphragmatic Hernia has led to an altered approach of initial stabilization of the patient followed by surgery. The correction of Congenital Diaphragmatic Hernia can no longer be treated as a pressing emergency.[19]

A large number of publications on biliary atresia, debate on the age of surgery, the amount of fibrosis at porta, or at portal triad vis-à-vis the result of Kasai procedure. The realization is that the pathology is an ongoing process and the result of the Kasai procedure depends on the time of onset of the pathology. So if the disease had started in the prenatal period, the result of even a properly done surgery before 60 days of age, are likely to be poor. Conversely in a patient in whom the disease started late, surgery done at a later age may be satisfactory.[20]

Attaining good continence in a patient of anorectal malformation is a challenge even today. The concept of striated muscle complex and placement of pulled-through colon in the complex (for better continence) is well documented. It is also evident that congenital and iatrogenic damage to the pelvic nerves along with the problem of the tethered cord also plays a significant role in achieving continence. Endoscopy assisted pull-through is perhaps the best approach for causing minimal damage to pelvic nerves and pelvic floor muscles while performing a pull-through and placing the bowel inside the muscle complex.[21] Development of good cerebral cortical function is also important. It is interesting to note that these patients in adult life handle their continence related difficulties very well. We are proud that the observations made in this regard by the Pediatric Surgeons of India and our documentation of various types of pouch colon, rectal atresia, rectovaginal fistula, and double termination of anorectum (H type fistula) has now been recognized by the whole world.[22]

It took more than six decades to devise a corrective surgery for Hirschsprung’s disease. Subsequently, many other techniques were developed, the latest being laparoscopy-assisted surgery. The principal includes excision of the aganglionic segment including the transition zone, doing an internal sphincterotomy, and pulling down a well mobilized proximal bowel, which can also be laproscopy assisted.[23] The refinement to various techniques is to cause minimal damage to pelvic floor muscles and nerves. The recognition of diseases like intestinal neuronal dysplasia and persistence of constipation in some patients even after a correctly performed pull-through are the unresolved problems.[24,25]

In patients of common solid tumors, encouraging learning is that neoadjuvant chemotherapy is a practical alternative and can be administered without a biopsy which may upstage a tumor. This has made surgery safer and has improved survival figures.[26-29]

There is a paradigm change in the management of hemangioma and lymphangioma. Emphasis has shifted from heroic surgery to systemic pharmaceutical agents or local sclerosent.[30,31]

The concept of the development of neural tube defect has undergone a sea change. The latest investigation modalities have enabled us to diagnose many associated pathologies. Conversely, such defects may coexist with other defects of the myotome. This proves that many of the anomalies are interrelated and may be the result of same gene defect or is the result of a single embryonal insult.

Our journey in the field of corrective surgeries in the fetus has just started.[32]

The availability of a large number of invasive and noninvasive investigation modalities has enabled us to better understand many of the diseases, diagnose and follow them properly and prognosticate them correctly. As the understanding of the pathology of various diseases has changed, we also have made course corrections on many occasions.

It is true that endoscopic surgery has taken the shine off open surgery to a large extent. The initial concern was the training of personnels and the cost of surgery which has been overcome. Now robotic surgery is making inroads. As with any new technological advancements, Robotic Surgery will also demand extensive training and large investments. The same concerns that were raised about endoscopic surgery, have again been raised today and history will repeat itself.[33] The answer lies in the indigenization of technology and self-reliance.

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Ashoke Kumar Basu
Department of Pediatric Surgery, Institute of Child Health, Kolkata, West Bengal, India
Address for correspondence: Prof. Ashok Kumar Basu, Department of Pediatric Surgery, Institute of Child Health, Kolkata, West Bengal, India. E-mail: ashokkbasu@gmail.com

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