Neonatal Surgery: A Ten Year Audit from a University Hospital

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ABSTRACT

Neonatal surgery is the flagship and most challenging component of pediatric surgery, which is the youngest subspeciality of surgery. Neonatal surgery carried a survival rate of only 30% three decades ago. In the last decade there has been a significant change in the scenario. Earlier recognition and referral of these anomalies, availability of neonatal intensive care, better preoperative planning, decision, and techniques have lead to the change in the management. This is an audit into the outcome of neonatal surgery from one of the largest units in India over a ten year period. This audit reveals an across the board survival of 65-70% newborns after surgery on nearly two thousand case over a ten year period. It has an important message that while pediatric surgery units expand, risk stratification of surgical newborns and their treatment in suitable units is mandatory to maintain and improve these figures to match international standards over the next decade.

Key words: Neonatal surgery; Tracheoesophageal fistula (TEF); Congenital diaphragmatic hernia (CDH); Bowel atresia

MATERIAL AND METHODS

All newborns admitted to the neonatal surgical unit for surgery between the period of 1996-2006 were included in the study. The data was collected retrospectively from the admission register and examination of admission files. A database was created recording the gestation, day of life on referral, surgical diagnosis, operative findings and surgery outcome. The surgical babies were then classified into different groups i.e., gastrointestinal, thoracic, genitourinary, neurosurgical etc. Outcome of the babies were classified into three groups (a) discharged after treatment (b) died during the course of treatment (c) IEAF against medical advice (LAMA). Standard statistical method was used to define the measure of outcome.

RESULTS

During the ten year period of study, as per the admission register 1873 babies were admitted for surgical treatment. Only 10% were inborn, the rest were brought directly by parents or referred from the neighbouring units. The mean age of admission was 7.2 days with a range of 1-28 days.

The male to female ratio was 1.9:1. The mean birth weight of babies was 2100 gms (1200g-3700g). Among all the babies admitted, the malformations of central nervous system was the highest, which constituted 39% of all neonatal surgical admissions.

Gastrointestinal Surgery

The common malformations of gastrointestinal tract leading to admissions were anorectal malformation, intestinal obstruction, Hirschsprung disease, malrotation, pyloric stenosis and abdominal wall defects.

Anorectal malformations

The mean age of presentation of anorectal malformations was 6.2 days with (range 1-30 days). The girl babies were brought in distinctly later as many of them continue to
Late complications included adhesive bowel obstruction (23%) cases of the 230 neonates, including 46% females and 54% in 8% cases. Jejunoileal obstruction was found in 61% of 18% as type IIIa, 7% as type IIIb (“apple peel” atresia), and in 9% cases, and superficial wound infection in 2% cases.

Upper gastrointestinal contrast enhanced examination also showed partial duodenal obstruction in 46% neonates with duodenal stenosis. Patients with duodenal obstruction were treated by duodenostomy in 86% cases, duodenotomy with web excision in 8%, and duodenoejunostomy in 6% cases. Downs syndrome was associated in 37% of cases and annular pancreas in 12% of cases. Postoperative complications included anastomotic obstruction in 12% cases, congestive heart failure in (11%) cases, prolonged adynamic ileus in 6% cases, pneumonia in 9% cases, and superficial wound infection in 2% cases. Late complications included adhesive bowel obstruction in 8% cases. Jejunoileal obstruction was found in 61% of cases of the 230 neonates including 46% females’ 54% males. 37% neonates were premature. Associated anomalies were present in 23% cases like omphalocoele, cardiac anomalies, renal anomalies and skeletal abnormalities. At the time of surgery, 23% of the jejunoileal atresias were classified as type I, 27% as type II, 18% as type IIIa, 7% as type IIIb (“apple peel” atresia), and 24% as type IV (multiple atresias). Postoperative complications included adhesive bowel obstruction (early and late) in 28% cases, anastomotic leak in 8% cases and superficial wound infection in 75% cases.

Small or large bowel atresia

During this period, 230 cases of intestinal atresia were admitted. Mean age of presentation for intestinal atresia was 3.2 days (range 1-7 days). Duodenal atresia was observed in 36.5%, jejunal atresia 32.1%, ileal atresia 29.5% and colonic atresia in 1.9% cases. Single atresia was observed in 79.6% cases and multiple atresias in 20.4% cases. Overall mortality was 18% (mainly apple peel type atresia), 7.2% cases opted LAMA and overall survival was 74.8%. Clinical presentation included bilious emesis or aspirates in neonates, upper abdominal distension and feeding intolerance. Diagnosis was achieved in most instances by plain abdominal radiographs, which demonstrated the characteristic “double-bubble” sign. Upper gastrointestinal contrast enhanced examination showed partial duodenal obstruction in 46% neonates with duodenal stenosis. Patients with duodenal obstruction were treated by duodenostomy in 86% cases, duodenotomy with web excision in 8%, and duodenoejunostomy in 6% cases. Downs syndrome was associated in 37% of cases and annular pancreas in 12% of cases. Postoperative complications included anastomotic obstruction in 12% cases, congestive heart failure in (11%) cases, prolonged adynamic ileus in 6% cases, pneumonia in 9% cases, and superficial wound infection in 2% cases. Late complications included adhesive bowel obstruction in 8% cases. Jejunoileal obstruction was found in 61% of cases of the 230 neonates including 46% females’ 54% males. 37% neonates were premature. Associated anomalies were present in 23% cases like omphalocoele, cardiac anomalies, renal anomalies and skeletal abnormalities. At the time of surgery, 23% of the jejunoileal atresias were classified as type I, 27% as type II, 18% as type IIIa, 7% as type IIIb (“apple peel” atresia), and 24% as type IV (multiple atresias). Postoperative complications included adhesive bowel obstruction (early and late) in 28% cases, anastomotic leak in 8% cases and superficial wound infection in 75% cases.

Hirschsprung’s Disease (HD)

One hundred eighty-three cases of HD were admitted during study period. Most of the cases (79%) were classical short segment, 1.8% was ultra short segment, 16% were long segment and rests were total colonic or severe type. Male to female ratio was 3:1. 43% (79) cases were managed by single stage Duhamel operation and rest were managed with two-stage operation. 8 (4.3%) cases opted LAMA, mortality was observed in 21 (11.4%) cases and overall survival was 84.3%.

Malrotation gut with or without midgut volvulus

Seventy-nine cases of malrotation in neonatal age group were admitted during study period. Mean age of presentation was 15.2 days (range 3-26 days). Male to female ratio was 1.67:1. Most common presentation was bilious vomiting followed by failure to pass meconium. In 14 (17.7%) cases malrotation was associated with midgut volvulus. Mortality was observed in 10.3% cases, all had associated delayed diagnosis of midgut volvulus. Three cases left against medical advise and overall survival was 86%. About 5% cases were readmitted for sub-acute intestinal obstruction and were managed conservatively.

Infantile Hypertrophic Pyloric Stenosis (IHPS)

A total of 63 cases of IHPS were admitted during study period. Most of the patients presented with non-bilious projectile vomiting and few presented with gross dehydration and non-acceptance of food. In 91% cases pyloric tumor was palpable and in 69% cases visible gastric peristalsis was evident. Mainstay of diagnosis was clinical which was documented by ultrasonography finding. Mean duration of stay was 6.4 days (range 5-8 days). All had pyloromyotomy, mucosal perforation happened in 3 babies and 5 babies required exploration either for perforation or missed Ladds bands.

Abdominal Wall Defects

During the study period, 80 cases of abdominal wall defects (59 of exomphlos and 21 cases of gastroschisis) were managed. Mean age of presentation was 3.1 days (range 1-6 days). Most of these patients were treated with conservative management. Overall mortality was 38.9%, higher in surgically managed patients. In 21 cases of gastroschisis, overall mortality was 60% and 7% cases opted LAMA. Most of the patients of gastroschisis were managed by primary closure and others were treated by silo followed by primary closure. The overall survival of gastroschisis in our experience is 47%.

Thoracic Surgery

During last 10 years there were drastic changes in management of these cases at our centre. Initially survival was slightly more than 50% but now it is over 75%. In the period, 334 cases of EA/TEF had been admitted during study period. Only 16.7% cases were diagnosed antenatally. Most common type was type III-B (82.6%), followed by pure esophageal atresia (13.7%). We observed only 1.7%, 1.5% and 0.5% cases of double fistula, H-type fistula and fistula in proximal esophagus. Overall survival was 57.2%, mortality was 34.3% and 8.5% cases opted