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ORIGINAL ARTICLE

The Outcome of Different Surgical Conditions in Neonates at A Tertiary Care Hospital: A Cross-Sectional Study

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ABSTRACT

Aim: To determine the outcome of different surgical conditions in neonates at a tertiary care hospital

Study design: A cross-sectional study

Place and Duration: Department of Pediatric Surgery Chandka Medical College Children's hospital Larkana from Nov 2020 to Nov 2021

Methodology: All the neonates with surgical conditions were admitted through emergency and OPD. The variables were age, gender, diagnosis, surgery performed, postoperative course and complications if any. Patients soon after birth to 28 days of age with neonatal surgical conditions were enrolled in the study. The diagnosis was established either with pre-operative, intra-operative or post-operatively with relevant clinical, radiological, biochemical and histopathological findings described in standard textbooks of paediatric and neonatal surgery

Results: A total of 208 patients were managed. The age range was 1 hour to 28 days. Male was 159 (76.4%) and 49 (23.6%) were female. The commonest conditions presented were anorectal malformations followed by necrotizing enterocolitis. Other conditions include Hirschsprung's Disease, Omphalocele, Gastroschisis, Duodenal and Jejuno ileal Atresia, Myelomeningocele, Infantile Hypertrophic Pyloric Stenosis, Obstructed Inguinal Hernias, sacrococcygeal teratoma and skin and soft tissue infections. Frequently performed operation was the creation of stoma (Colostomy/Ileostomy). 180 (86.53%) neonates were discharged and 24 (11.53%) neonates expired while only 4 (1.92%) neonates were referred to other centers.

Conclusion: Neonatal surgical conditions carry high mortality and morbidity even at centers with all facilities available. Our results at the resource-limited centre are comparable to the centres having state of art facilities.

Keywords: Neonatal surgery, Anorectal Malformations, Abdominal wall defects, Necrotizing Enterocolitis (NEC)

INTRODUCTION

Neonatal surgery is a recognized sub-speciality of pediatric surgery and has flourished and grown in the last few decades and it is the discipline which distinguishes paediatric surgeons from adult surgeons.[1] Surgery of a neonate is an extremely sensitive, sophisticated and delicate kind of surgery especially in a setup without the facility of a neonatal intensive care unit (NICU), total parenteral nutrition(TPN), expert neonatal anesthesia team and specialized nursing staff.[2] Management of neonate with surgical conditions poses an extraneous challenge for the Paediatric surgeon and the neonate as well, especially in developing countries like Pakistan where the above-mentioned facilities are still lacking.[3] Prolonged duration of operation, blood loss during surgery and hypothermia during or after surgery can worsen the outcome.[4] In economically poor countries neonatal mortality is still high in comparison to developed countries because of access to prenatal diagnosis and scarcity of trained personnel. Set up for Neonatal surgery and care in Pakistan is fair in a few centers, in some cities but in most of the centers it is still considered a challenge and needs a lot of work to improve the facilities.

The indications for surgery in neonates are mainly congenital malformations.[5] several congenital anomalies are correctable with surgery, if not recognized and treated timely, will lead to the death of the affected newborn soon after birth. The various surgical conditions presenting in the neonatal period include anorectal malformations, Hirschsprung's disease, atresia of the small and large intestine, esophageal atresia, necrotizing enterocolitis (NEC), abdominal wall defects (omphalocele and gastroschisis), strangulated inguinal hernias, neural tube defects, infantile hypertrophic pyloric stenosis, bladder and cloacal exstrophy, posterior urethral valves, teratoma and skin and soft tissue infections.[3]

The department of Paediatric surgery Chandka Medical College Children Hospital Larkana is a tertiary care center for paediatric and neonatal surgery but the facilities of NICU, TPN and trained nursing staff are not available. In spite of the limited resources, we use to manage newborns with surgical conditions still with fair outcomes.

The present study was conducted to observe the neonates presenting with different surgical conditions and managed Children observe the outcome of management and compare the data with published literature.

METHODOLOGY

This descriptive cross-sectional study was conducted at the department of Pediatric Surgery Chandka Medical College Children's Hospital of SMBBMU Larkana from November 2020 to November 2021. Patients were admitted through emergency and OPDs depending upon the nature of the condition of the patient. Patients soon after birth to 28 days of age with neonatal surgical conditions were enrolled in the study. The diagnosis was established either with pre-operative, intra-operative or post-operatively with relevant clerical, radiological, biochemical and histopathological findings described in standard textbooks of paediatric and neonatal surgery. All the babies were kept in the general ward of the hospital without a special facility for temperature control the patients were monitored manually without electronic monitoring devices and with inadequate nursing care. The surgeries were performed mainly by consultants. The consent from the parents of patients was obtained to enrol in the study. Data was collected in terms of patient age, sex, diagnosis, surgical procedure and outcome. The data were entered into the SPSS version 20. Categorical data were entered as frequencies and numerical data were presented as mean.

RESULTS

A total of 208 patients were managed during the study period. Age of the patients ranged from 1 hour to 28 days. The majority of the patients were male 159 (76.4%) while female babies were 49 (23.6%) in number.

The average weight of the patients was 2.6 kg (range from 1 to 4 kilograms). All the patients with necrotizing enterocolitis and 10 patients with gastroschisis were low birth weight.

The system most commonly affected was the gastrointestinal system and anorectal malformation was the most frequent condition. Table No. 1

All the neonates were resuscitated and stabilized before undergoing any surgical procedure by keeping NPO, administering intravenous fluids and broad-spectrum antibiotics postoperative and blood/productions transfusions. All the efforts were used to maintain the body temperature and avoid hypothermia. The most common surgical procedure done was creating a stoma (colostomy/ileostomy). Table No. 2

Postoperatively different complications were noticed and most were related to stoma and site of the incision. (As shown in Table 3. The complications were managed accordingly.

Out of 208 patients, 180 (86.5were 3%) patients improved and discharged and 24 (11.53%) neonates expired while 4 (1.92%) patients with esophageal atresia were referred to other centers due to non-availability of ventilators. Figure No. 1.

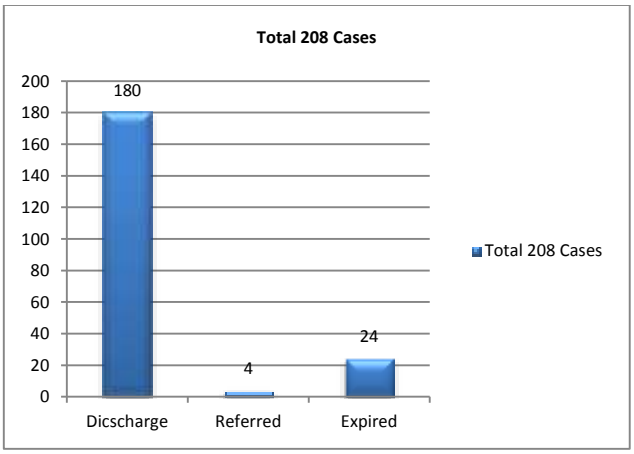

Figure 1: Outcome of the study participants

Table 1: Various system involvement of the study participants

Gastrointestinal System	T
Anorectal Malformations High Low	85 (40.86%) 50 35
Hirschsprung's Disease	20 (9.61%)
Necrotizing Enterocolitis	22 (10.57%)
Jejunoileal Atresia	07 (3.36%)
Duodenal Atresia	05 (2.40%)
Meconium Ileus	02 (0.96%)
Esophageal Atresia	04 (1.92%)
Exstrophy	03 (1.4%)
Infantile hypertrophic pyloric stenosis	05 (2.40%)
Obstructed Inguinal Hernia	05 (2.40%)
Abdominal wall defects Omphalocele Gastroschisis	23 (11.05%) 12 11
Urogenital system Bladder exstrophy Cloacal exstrophy Posterior urethral valves Urogenital sinus with hydrometrocolpos	09 02 (0.96%) 02 (0.96%) 03 (1.44%) 02 (0.96%)
Neural tube defects Myelomeningocele	04 (1.92%)
Congenital Tumors Sacrococcygeal teratoma Lymphangioma	06(2.88%) 03 (1.44%)
Skin and Soft tissue infections	05 (2.40%)
Total	208

Table 2: Various procedures done on study participants

Gastrointestinal System	
Sigmoid Colostomy	70
Ano plasty	35
Angioplasty	22
Laparotomy Resection anastomosis Ileostomy	17 12 O5
Inguinal Herniotomy	05
Abdominal Wall Defects	
Gastroschisis: Primary Repair Silo bag Omphalocele: Primary repair Paint and Wait	4 7 3 9
Congenital Diaphragmatic Hernia	03
Urogenital System Bladder exstrophy repair Cloacal exstrophy repair Posterior Urethral Valve: Vesicostomy Urogenital Sinus with Hydrometrocolpos: Vaginostomy	 02 02 03 02
Neural Tube Defects: Myelomeningocele: Repair	 04
Sacrococcygeal Teratoma: Excision	 05

Table 3: Postoperative complications in study participants

Stoma related complications (Peristomal excoriation, Bleeding, Prolapse)	30
Surgical site infection	7
Partial wound dehiscence	6
Delayed or non- working of anastomosis	3
Anal stricture	3

DISCUSSION

It is very well known that more than 4 million newborns, die every year soon after birth and about 98% of these deaths occur in developing countries. For these neonatal deaths, birth anoxia and infections are the major contributors. However the other hidden contributors are the surgical conditions which are usually not high achieved united nation's sustainable goal (SDG-3) target of resource-limited neonatal deaths the by the year 2030, will not be achieved without improving surgical care for neonates, in resource-limited places.[4, 6] Even when the antenatal diagnosis is made of a congenital anomaly (if the facility was available), there is the long-term psychological impact on the expectant parents and family. The hopes and dreams of parents are overwhelmed with fear of the long-term morbidity of death.[7]

Recent advances in the management of neonatal surgery have resulted in the improvement of survival of newborn babies with various types of congenital malformations which were considered lethal formerly. The improved obstetric care, perinatal diagnosis of congenital pathologies/malformations, advances in neonatal anesthesia, refined surgical techniques especially the introduction of minimally invasive techniques and appropriate management of associated abnormalities, all have contributed to the improvement in the survival of neonates with surgical conditions.[7, 8]

None of the patient's conditions was diagnosed antenatally. The mean age of presentation of our patients was 5.22 days with a range of arrival of patients immediately after birth within 1st hour of life to 28 days of age. We found male predominance in our study. The majority of our patients were presented within 1st week of life for obvious abdominal wall defects, absent anal opening and with signs and symptoms of intestinal obstruction, the same mode of presentation is also reported in the literature.[2, 6]

The gastrointestinal conditions were the most common neonatal surgical conditions noticed in our study and anorectal malformations were the commonest (40/86%) followed by necrotizing enterocolitis (10.57%) and Hirschsprung's disease (9.6%), resembling figures are reported in the literature by Saha and Ekwunife.[2,9] Data published by Ali Raza and others[10] show a higher percentage of cases of Duodenal atresia as compared to our study but their figures for Hirschsprung's disease are nearly similar, however, in the present study, the number of patients with necrotizing enterocolitis were on the higher side in comparison to above-mentioned study.

During the study period, the neonates underwent different surgical procedures. Stoma in the form of colostomy or ileostomy comprised the operation frequently performed in case of

imperforate anus, Hirschsprung's disease, ileal atresia and meconium ileus, because the cases of anorectal malformations of high and intermediate variety and Hirschsprung's disease are traditionally managed in staged surgery.[11] All the neonates with NEC underwent peritoneal intubation as the primary surgical procedure while 4 of them required laparotomy and ileostomy as their condition was not improving with peritoneal intubation only. This type of management is supported by published literature.[12, 13] The surgical procedures performed are shown in Table No. 2 and resembling data for such surgical procedures are also published in the literature.[9]

The increased survival of small babies with complex congenital malformations has led to increase in parental expectations for the effectiveness of the treatment but unfortunately, it is not the case every time and the neonate might suffer postoperative complication/s resulting in an increase in hospital stay and increased risk of death or irreversible problems.[7] Various complications noticed during the study period were mainly related to stomas and were Peristomal excoriation, stoma prolapse, and bleeding. None of our patients developed leakage of intestinal anastomosis. In spite of working in low-resource centers with scares facilities, the complication rates were on the lower side in the present study as compared with published literature.[9, 10, 12]

Out of 208 patients, 180 (86.53%), patients improved and were discharged home while only 4 (1.92%) patients with esophageal atresia were referred to other centers due to the non-availability of ventilators. During the study period 24 (11.53%), neonates expired. The cause of death was septicemia and hypothermia. The highest mortality rate was noted in patients with gastroschisis and necrotizing enterocolitis and prematurity and low birth weight were the contributing factors. The same results for cases of gastroschisis and NEC are also reported from Bangladesh.[3]The mortality associated with neonatal surgical conditions range from 21-45% in developing countries and is <15% in European countries.[14] The mortality rate of surgical neonates at our department in spite of limited resources is on the lower side as compared with other studies conducted in resource-poor setup.[13, 14]

This may be a discrete clinical entity from NEC in preterm newborns, according to a study's conclusion that neonates present with different illness patterns and experience different outcomes. [15] In gastroschisis, clinical traits can be utilised to separate survivors from non-survivors. [16] According to a study, lower pH values and higher CRP levels are prognostic indicators of the need for surgery, whereas later onset necrotizing enterocolitis is a protective sign for the progression to surgery. Low morbidity and fatality rates appear to be favourable outcomes for the therapeutic approach that involves exploratory laparotomy in cases of perforation. [17] Neonatal congenital blockage of the gastrointestinal tract is a prevalent issue, with anorectal abnormalities being the most common cause (41%), followed by esophageal obstruction (24%), and duodenal obstruction (20%). [18] Prematurity and low BWs are common in these cases, despite the pleomorphic aetiology of neonatal stomach perforation. Reviewing our experience and the existing research, we found that none of the variables was related to death except sepsis. [19] Congenital diaphragmatic hernia care must be improved, and it must go far beyond handling postoperative problems. To guide future practice, randomized controlled studies are necessary, specifically on the results of thoracoscopic repair. [20]

CONCLUSION

Neonatal surgical conditions need sophisticated and intensive care. Mortality and morbidity can be decreased by antenatal or early post-natal diagnosis and timely intervention and availability of neonatal ICU, TPN and specialized nursing care and by improved perioperative and postoperative management.

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