Original Article

Post operative neonatal survival A real challenge in a setup with no intensive care unit!

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Objective: To review the challenges in postoperative neonatal outcome in a setup with no ICU.

Methodology: This retrospective study of neonates was conducted at the Pakistan Institute of Medical Sciences, Islamabad, Pakistan from January 2013 to December 2013. The data was analyzed in terms of age, weight, gender, mode of delivery, time & mode of presentation, diagnosis, intervention, outcome and complications.

Results: During the study period, 526 neonates were admitted, of which 376 (71.48%) were operated. Majority of cases presented between 3 to 10 days. The condition encountered were anorectal malformation (131, 34.8%), esophageal atresia (96, 25.25%), gastrointestinal atresia (37, 9.8%), malrotation (26, 6.91%), pneumoperitonium (26, 6.91%), soft tissue infection (25, 6.64%), Hirschsprungs disease (14, 3.7%), abdominal wall defects (10, 2.6%), diaphragmatic hernia (8, 2.1%) and sacrococyxgeal teratoma (3, 0.79%). The overall postoperative survival was 59.04%. Most of neonates died at the 3rd to 5th postoperative day due to sepsis, hypothermia, and electrolytes imbalance. The highest mortality was seen in esophageal atresia (30, 19.48%) followed by complicated intestinal obstruction (53, 34.41%).

Conclusion: Postoperative neonatal survival was 59.04. Sepsis, electrolyte imbalance and hypothermia were the major causes of death. Preterm and low birth weight along with late presentations of neonates contributed to higher rate of morbidity and mortality. We propose that appropriate utilization of the available resources can improve postoperative neonatal survival in Pakistan. (Rawal Med J 201;41:61-63).

Key words: Neonatal mortality, post operative survival, neonatal sepsis, esophageal atresia.

INTRODUCTION

The postoperative management of neonates remains a challenge, as it requires a multidisciplinary approach. Collaboration between the pediatric surgeons, neonatologist, pediatric cardiologist and obstetrician are mandatory to obtain the optimal results. In developing countries, where the health resources are limited, illiteracy, unplanned pregnancies, deliveries at periphery by untrained midwifes and late referral to tertiary care have played a vital role in the high rate of morbidity and mortality.[1] On the other hand, in developed countries where health infrastructures are good, majority of these congenital anomalies are mostly detected during antenatal visit and planned delivery and timely referral to highly equipped tertiary care hospitals, the mortality and morbidity are less.[2,3] Post operative period is a very critical time and all neonates with surgical emergencies require intensive care unit (ICU) for close monitoring. However, in countries like Pakistan, where there are scarce health resources, most of neonatal surgical emergencies are managed without ICU, thus the rate of morbidity and mortality remains high. The aim of this study was to have an insight into the post operative neonatal survival in non ICU set up and its effect on the overall morbidity and mortality in this part of Pakistan.

METHODOLOGY

It is a single institution tertiary care unit retrospective study of one year duration from January to December 2013 done at Pakistan Institute of Medical Sciences, Islamabad, Pakistan. The catchment area of this institution includes areas from Azad Kashmir, KPK, Gilgit Baltistan, FATA and upper Punjab. A total of 526 neonates with neonatal surgical issues presented during the study period; of these 376 underwent surgery. The data was analyzed in terms of demographic data like age, gender, mode of delivery, time and mode of presentation, diagnosis, intervention and outcome.

The patients from age 0 to 28 days with surgical problem who were fit for general anesthesia and those who were not shifted to neonatal ICU post operatively were included in the study. Patients above age of 28 days not fit for general anesthesia and those who were noted shifted to neonatal intensive care unit after surgery were excluded. Cases having neural tube defects and who died before the intervention were excluded from the study. All patients were operated with a surgical unit headed by a consultant surgeon. Survival was defined as a child remaining alive after surgery till discharge and was well when sent home. Data were analyzed using SPSS version 20.0.

RESULTS

Out of 526 neonates admitted during study period, 376 (71.5%) were included for analysis. The mean age on admission was 56.4±124.6 hours (range 12 hours-28 days). There were 257 (68.3%) males and 119 (31.6%) females, giving the male to female ratio of 3:1. Of 376 cases, 193 (51.3%) had antenatal workup and 194 (51.6%) of mothers belonged to rural areas.

The digestive system was most commonly involved part with a surgical condition in 304 (80.8%) neonates (Table 1).

Table 1: Diagnosis of patients undergoing surgical procedures (n=376)

Diagnosis	Total	%	Survival	%	Deaths	%
Anorectal Malformation	131	34.8	92	70.2	39	29.7
Tracheo esophageal fistula with esophageal atresia	96	25.2	66	68.7	30	31.2
Hirschsprungs disease	14	3.7	8	57.1	6	42.8
Small bowel atresia	37	9.8	16	43.2	21	56.7
Pneumoperitonium	26	6.9	7	26.9	19	73.1
Congenital diaphragmatic hernia	8	2.1	3	37.5	5	62.5
Ant abdominal wall defects	10	2.6	4	40.0	6	60.0
Malrotation	26	6.9	13	50.0	13	50.0
Sacro coccegeal teratoma	3	0.8	2	66.6	1	33.3
Soft tissue infections	25	6.6	11	44.0	14	46.0

Table 2. Causes of mortality in the study (n=154).

Cause of mortality	Number	%
Sepsis	64	42%
Electrolyte and metabolic imbalance	32	21%
Hypothermia	23	15%
Respiratory arrest	9	6%
Renal failure	8	5%
Excessive bleeding	5	3%
Short bowel syndrome	5	3%
Others	8	5%

Of all operated neonates, 222 (59.0%) survived whereas 154 (41.0%) died. Most of neonates died between day 3 and 5 postoperatively due to complications, mainly sepsis, hypothermia and electrolytes imbalance (Table 2). The highest mortality was caused in patients with esophageal atresia (30, 19.5%) followed by complicated intestinal obstruction cases (Table 2).

DISCUSSION

Neonatal surgical emergencies constitute a major health problem with an overall incidence between 3 to 6.1%.[1,4] There are various factors, such as limited resources, lack of trained medical staff, lack of interest by government that make the management of these neonates a challenging task.[1,5] The overall neonatal surgical mortality is published as 30.5% to 53.6%.[6,7] Various published studies show post operative mortality for a specific diagnosis rather than an overall incidence of post operative neonatal mortality, thus, it's difficult to compare our findings with the existing literature.

In our study, the over-all post operative neonatal survival without ICU set up was 59.6%. Similar to many other studies, in our study as well, the gastrointestinal tract anomalies were the commonest neonatal surgical emergency.[8] This included anorectal malformation, esophageal atresia with or without trachea esophageal fistula, bowel atresia in order of frequency.[6,9,10].

Major causes of death in our series was due to sepsis, hypothermia, metabolic and electrolyte imbalance and this was consistent with other reported literature.[2] Prematurity, unplanned deliveries at periphery and late referral had significantly increased the mortality and morbidity as these neonates are received in tertiary care hospital after sepsis and metabolic

derangement has already set in, these finding are comparable with other studies where similar observation have been made[1.]

The advantages of the current study include a large number of sample. In our data surgery per se had not increased the mortality and morbidity and it had some good outcome in these neonates who would have died if not operated. The limitations include the observational nature of the study and immediate outcome analysis only, as no data regarding long term survival was available due to lack of data on follow-up. We recommend increasing the medical staff (nurses & doctors) and implement appropriate segregation of infectious from non-infectious cases. Basic training and education (hygiene, vigilance and recognition of red flags) of mothers may play a pivotal role in improving the postoperative neonatal outcome.

CONCLUSION

Post operative neonatal survival with neonatal ICU in our study was around 60%. It is mandatory that every neonate undergoing surgery must have an ICU support. Given the facts on the ground, we propose that appropriate utilization of the existing resources can improve postoperative neonatal survival in Pakistan. This can be achieved through training of healthcare workers and advocacy of mothers and care takers in keeping hygiene and remaining vigilant about the red flags.

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REFERENCES

1. Ugwu RO, Okoro PE. Pattern, out come and challenges of neonatal surgical cases in a tertiary teaching hospital. Afr J Pediatr Surg 2013;10:226-30
2. Smith LK, Judith LS Budd, Field DJ, Draper ES. Socio-economic inequalities in outcome of pregnancy and neonatal mortality associated with congenital abnormalities: population based study. BMJ 2011;343:d4306 doi: 10.1136/bmj.d4306
3. Murthy K, Dykes FD, Padula MA, Pallotto EK, Reber KM, Durand DJ, et al. The Children's Hospital Neonatal Database: an overview of patient complexity, outcomes and variation in care. J Perinatol 2014. doi:10.1038/jp.2014.26
4. Bickler SW, Kyambi J, Rode H. Pediatric surgery in sub-saharan Africa. Pediatr Surg Int 2001;17:442-7.
5. Kendig CE, Samuel JC, Varela C, Msiska N, Kiser MM, McLean SE, et al. Pediatric surgical care in Lilongwe, Malawi: outcomes and opportunities for improvement. J Trop Pediatr 2014;60:352-7.
6. Osifo OD, Okolo JC. Neonatal intestinal obstruction in Benin, Nigeria. Afr J Pediatr Surg 2009;6:98-101.
7. Sowande OA, Ogundoyin OO, Adejuyigbe O. Pattern and factor effecting management outcome of neonatal emergency surgery in Ile-Ilf. Nigeria. Surg Pract 2005;42:82-3.
8. White RD. Surgical emergencies In: Robert KB, editor. Manual of clinical problems in pediatrics. 5th ed. Lippincott Williams and Wilkins Publishers; 2000.p. 275-81.
9. Ameh EA, Dogo PM, Nmadu PT. Emergency neonatal surgery in developing countries. Pediatr Surg Int 2001;17:448-51.
10. Osifo OD, Oveueni ME. The prevalence, pattern and causes of death of surgical neonates at two referral pediatric surgical centers. Ann Pediatr Surg 2009;5:194-9.