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Research Article

An Analytical Study Of Factors Affecting Neonatal Surgical Morbidity And Mortality

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ABSTRACT

AIM: Neonatal surgery is extremely challenging and should have a negligible margin of error.Timely interventions play a crucial role in determining better outcomes, thereby improving quality of life & reducing disability. Hence this study is to assess various factors affectingthe neonate preoperatively, intraoperatively, and postoperatively regardingmorbidity and mortality. So that predictors of mortality can be identified and managed.
The aims and objectives of this study are
(1)To provide a holistic assessment of the factors affecting neonatal surgical morbidity and mortality.
(2)To stratify patients into different risk groups. (3)To study the results over a time for the improvement of services.
MATERIALS AND METHODS: Hundred(100)Neonates presenting at Government General Hospital/ Rangarayamedical college, Kakinada, with conditions requiring surgical intervention from July 2021 to December 2022.
RESULTS: Mean age at presentation is six days, mean birth weight is 2.2kgs, 62% male, 67% were outborn, gestational age associated with poor outcome was less than 34weeks, 11% cases were ventilated preoperatively, 21% cases were associated with anomalies. Mortality rate of 26% was reported.

Keywords: *Neonatal mortality- morbidity-sepsis-surgical intervention-time of presentation-Institutional delivery-preterm delivery*

INTRODUCTION

Surgery on newborns is one of medical science's most challenging branches. In developing countries, along with non-communicable diseases, there exists a burden of communicable diseases and malnutrition. Thus, there is a double burden of disease which slows the overall socio-economic development. Therefore, neonatal surgery might not be the top priority for health systems in developing countries, even if the surgical conditions are treatable. Initial care is vital for many surgical conditions[1]. If they are left untreated, the disease can lead to death or disabilities, which could have been prevented.

United Nations adopted the sustainable development goals[2]in 2015.The third goal aims to reduce preventable neonatal death,i.e., death in the first 28 days of life and under-five age deaths worldwide by 2030 to a maximum of 12 and 24 deaths / 1000 live births, respectively. Global mortality of neonates has been reported as 18 per 1000 live births, under-five mortalities as 39 per 1000 live births in 2018. Mortality rates have been reduced gradually since 1990.However,the distribution of deaths is not spread evenly across the globe.

United Nations recognised the neonatal period as the most vulnerable time for a child and is associated with a higher risk of mortality and a significant contributor to under-fivemortality accounting for 47 % of the total mortality. In the year2000, global 10.8 million deaths occurred in under-five agegroup, of which one-third are inthe neonatal period[3]. In 2017,2.5 million deaths occurred in the first month of life, with approximately 7000 neonatal deaths per day.

Neonatalmortality accounts for 53.1% of underage five deaths, and Neonatal Surgical mortality varies from 4 to 80%. Congenital anomaly is currently the 5th leading cause of neonatal mortality worldwide.

NEONATAL CAUSES OF DEATH

Globally, the main causes of neonatal deaths are summed up into three categories[4]:

1) Prematurity
2) Perinatal asphyxia[5]
3) Sepsis[6]

Neonate is born with unique physiological features of a narrow range of normalcy; beyond that, it is difficult to cope with adverse situations. When associated with life-threatening surgical conditions, neonate has to respond for its survival with these immature physiological systems. In the recent years, deaths due to perinatal causes are surpassed by congenital malformations, which are identified as the main cause of death in the 1st year of life[6].

Mortality rate increased from 11.4 % in 2000 to 20.7% in 2013; a possible explanation for this surge could be the improvement of healthcareservices, which helped maintain life in the early neonatal phase, enabling higher rates of diagnosis and reporting of these malformations[7].

Congenital malformations cause functional changes with the morphogenetic changes, with global prevalence being 2 - 3%[7]. The impact of congenital anomalies on infant mortality rate depends on access to and availability of facilities and the quality of medical and surgical treatment available. Neonate born in a developing country has a death risk 14 times greater[8] than a neonate ina developed country. The spectrum of surgical diseases among neonates includes various types of congenital anomalies and inflammatory necrotisingenterocolitis.

Common neonatal surgical causes seen in our hospital:

Anorectal malformations, Intestinal atresia – Jejunal and Ileal atresia, Duodenalatresia, Oesophageal atresia, Hirschsprung's disease, Congenital diaphragmatic hernia, Posterior urethral valves, Gastroschisis and Omphalocele, Exstrophy-Epispadias complex, Malrotation with midgut volvulus, Meconium peritonitis, Necrotisingenterocolitis with perforation, Persistent vitello intestinal duct anomalies.

AIMS AND OBJECTIVES

- To provide a holistic assessment of the factors affecting neonatal surgical morbidity and mortality.
- To stratify patients into different risk groups.
- To study the results over a time for the improvement of services.

METHODOLOGY

- Study design**:** Retrospective study
- Duration of the study**:** July 2021 to December 2022.
- Source of the data**:** Neonates presenting at Government General Hospital/ Rangaraya Medical College, Kakinada, with conditions requiring surgical intervention from July 2021 to December 2022.
- Sample size:100 PATIENTS
- Inclusion criteria: Both inborn and outborn neonates requiring surgical intervention.
- Exclusion criteria: Neonates operated outside and referred to GGH were excluded from the study.
- Method Of Study**:** Data collected includes birth weight, weight at the time of admission, Age at the time of admission, associated anomalies, if any, Physiological and laboratory parameters, intraoperative parameters like duration of surgery, amount of blood loss, Peritoneal contamination, time of extubation and post-operative investigations.
- The collected data were analysed with IBM SPSS Statistics for Windows, Version 29.0.(Armonk, NY: IBM Corp).

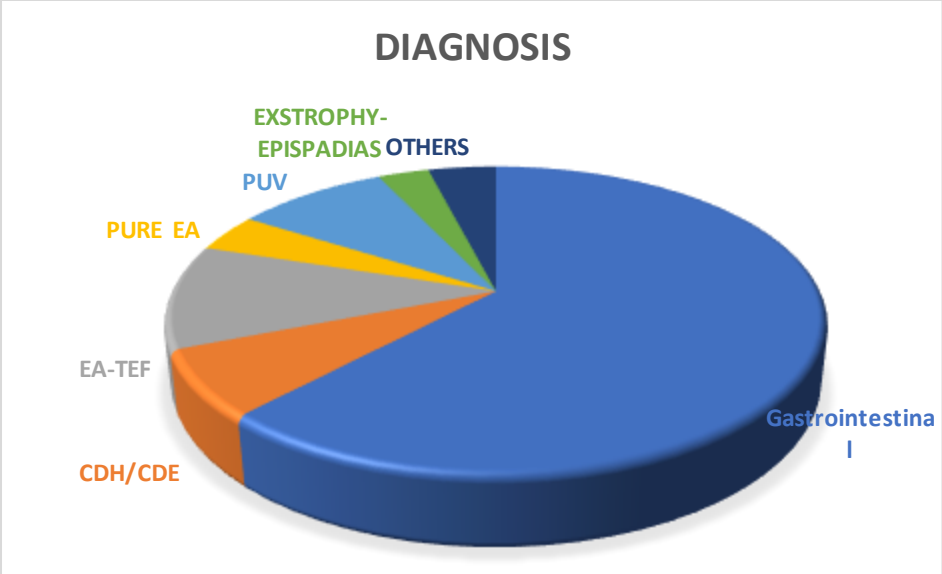
RESULTS

(1) DIAGNOSIS:

TABLE 3 :

DIAGNOSIS	NO.OF CASES	PERCENTAGE
Anorectal malformations	15	15%
Hirschprung's disease	14	14%
Intestinal atresia	15	15%
EA-TEF	11	11%
CDH/CDE	7	7%
Pure EA	4	4%
Omphalocele	3	3%
Gastroschisis	4	4%
Meconium peritonitis	9	9%

PUV	9	9%
Exstrophy-Epispadias	3	3%
Malrotation	3	3%
Others	6	6%



(2)GENDER

TABLE 4

Gender		Frequency	Percent
	F	38	38.0
	M	62	62.0
	Total	100	100.0

TEST	p-value
Chi-Square test	0.319

(3)PLACE OF DELIVERY

TABLE 5

INBORN	33	33%
OUTBORN	67	67%
TOTAL	100	100%

TEST	p- value
Chi-Square Test	0.007

(4) APGAR SCORE:

APGAR score is available only for 33 inborn cases.

(5) PREOPERATIVE VARIABLES

TABLE 6

Outcome		N	Mean	SD	p-VALUE
Birth Wt (kg)	Survived	74	2.8	0.4	0.0002
	Died	26	2.2	0.6	
Admission Wt (kg)	Survived	74	2.7	0.4	0.0005
	Died	26	2.1	0.6	
GA in weeks	Survived	74	35.8	1.7	0.002
	Died	26	33.6	3.3	
Presentation Age (days)	Survived	74	4.3	4.4	0.293
	Died	26	5.5	5.7	
HR beats/min	Survived	74	134.8	7.5	0.0005
	Died	26	146.4	8.7	

RR breaths/min	Survived	74	37.5	5.3	0.0005
	Died	26	49.2	9.2	
Mean Bp mm Hg	Survived	74	45.8	6.5	0.097
	Died	26	43.2	8.1	
Hb (g/dl)	Survived	74	13.1	1.9	0.0005
	Died	26	10.7	0.8	
Lactate (mmol/L)	Survived	63	2.3	5.1	0.002
	Died	25	24.9	31.8	
Temp (°F)	Survived	74	97.7	0.3	0.031
	Died	26	36.3	97.34	
CRP (mg/dl)	Survived	24	13.5	13.8	0.005
	Died	15	28.3	16.9	
TC (cells/cumm)	Survived	74	11526.5	4802.6	0.228
	Died	26	13493.8	7644.3	
GRBS (mg/dl)	Survived	74	112.1	22.4	0.003
	Died	26	97.5	17.3	
Platelets (Lakhs/cumm)	Survived	74	2.0	0.7	0.003
	Died	26	1.3	1.0	

(6)ASSOCIATED ANOMALIES
TABLE 7

	No. of CASES	PERCENTAGE
ANOMALIES PRESENT	21	21%
ANOMALIES ABSENT	79	79%
TOTAL	100	100%

TEST	Value
Chi-Square Test	0.002

7) VENTILATED PREOPERATIVELY
TABLE 8

	No.of CASES	PERCENTAGE
YES	11	11%
NO	89	89%
TOTAL	100	100

TEST	VALUE
Chi-Square Test	0.0005

(8)URINE OUTPUT
TABLE 9

			Outcome		Total
			Survived	Died	
Urine Output	<1ml/kg/hr	Count	12	19	31
		%	16.2%	73.1%	31.0%
	>1ml/kg/hr	Count	62	7	69
		%	83.8%	26.9%	69.0%
Total		Count	74	26	100
		%	100.0%	100.0%	100.0%

TEST	p-Value
Pearson Chi-Square	0.0005

(9)ALTERED COAGULATION
TABLE 10

			Outcome		Total
			Survived	Died	
Altered Coagulation	NO	Count	71	14	85
		%	95.9%	53.8%	85.0%

	YES	Count	3	12	15
		%	4.1%	46.2%	15.0%
Total		Count	74	26	100
		%	100.0%	100.0%	100.0%

TEST	p-VALUE
Fisher's Exact Test	0.0005

(10) INTRAOPERATIVE VARIABLES

TABLE 11

OUTCOME		Mean	p-Value
Duration of surgery (min)	Survived	106.4	0.001
	Died	136.9	
Blood loss (ml)	Survived	10.4	0.001
	Died	15.6	

(11)LEVEL OF CONTAMINATION

TABLE 12

			Outcome		Total
			Survived	Died	
Level Of Contamination	CLEAN	Count	27	6	33
		%	36.5%	23.1%	33.0%
	CLEAN CONTAM	Count	34	12	46
		%	45.9%	46.2%	46.0%
	CONTAMINATED	Count	13	8	21
		%	17.6%	30.8%	21.0%
Total		Count	74	26	100
		%	100.0%	100.0%	100.0%

TEST	p-Value
Pearson Chi-square	0.266

(12) EXTUBATION

TABLE 13 Crosstab

			Outcome		Total
			Survived	Died	
Extubated (Postoperatively)	NO	Count	6	21	27
		%	8.1%	80.8%	27.0%
	YES	Count	68	5	73
		%	91.9%	19.2%	73.0%
Total		Count	74	26	100
		%	100.0%	100.0%	100.0%

TEST	p-VALUE
Pearson Chi-Square test	0.0005

(13)POSTOP INVESTIGATIONS

TABLE 14

OUTCOME		N	Mean	SD	p-Value
Temperature (°F)	Survived	74	97.7	0.3	0.0005
	Died	26	96.44	0.3	
CRP mg/dl	Survived	65	11.2	20.5	0.0005
	Died	24	69.3	39.7	
TC	Survived	74	10310.0	3237.6	0.006
	Died	26	15189.2	8049.3	
Platelets (lacs/cumm)	Survived	74	1.9	0.6	0.0005
	Died	26	0.8	0.4	
GRBS (mg/dl)	Survived	74	114.6	23.2	0.003
	Died	26	96.9	15.6	

(14)VASOPRESSORS

TABLE 15

			Outcome		
			Survived	Died	Total
Vasopressor use in the post operative period	ADRENALINE	Count	5	6	11
		%	6.8%	23.1%	11.0%
	DOBUTAMINE	Count	0	1	1
		%	0.0%	3.8%	1.0%
	DOP & DOB	Count	0	1	1
		%	0.0%	3.8%	1.0%
	DOPAMINE	Count	0	14	14
		%	0.0%	53.8%	14.0%
	EXTUBATED	Count	1	0	1
		%	1.4%	0.0%	1.0%
	NIL	Count	68	4	72
		%	91.9%	15.4%	72.0%
Total		Count	74	26	100
		%	100.0%	100.0%	100.0%

TEST	p-Value
Pearson Chi-Square test	0.0005

(15) <u>POSITIVE CULTURE</u>

TABLE 16

			Outcome		Total
			Survived	Died	
Positive Culture	NO	Count	61	9	70
		%	82.4%	69.2%	80.5%
	YES	Count	13	4	17
		%	17.6%	30.8%	19.5%
Total		Count	74	13	87
		%	100.0%	100.0%	100.0%

TEST	p-VALUE
Pearson Chi-Square test	0.064

(16)<u>POST OPERATIVE CHEST X-RAY</u>

TABLE 17

			Outcome		Total
			Survived	Died	
CXR	NAD	Count	6	1	7
		%	8.1%	3.8%	7.0%
	NO	Count	63	19	82
		%	85.1%	73.1%	82.0%
	YES	Count	5	6	11
		%	6.8%	23.1%	11.0%
Total		Count	74	26	100
		%	100.0%	100.0%	100.0%

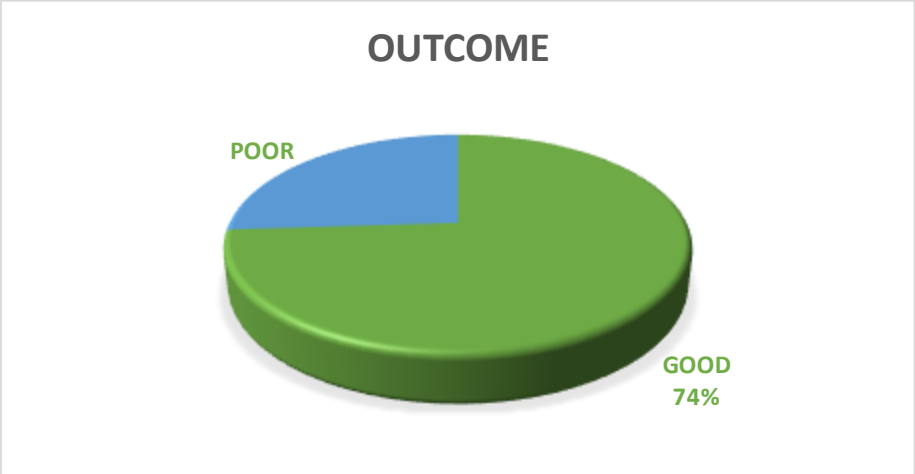
Fisher's Exact Test	0.272

(17) <u>TIME TO FEED</u>

TABLE 18

OUTCOME		N	Mean	SD
Time to feed	Survived	74	3.7	2.0
	Died	26	3.2	2.3

p-VALUE - 0.332



(18) OUTCOME
TABLE 19

		Frequency	Percent
	Survived	74	74.0
	Died	26	26.0
	Total	100	100.0

DISCUSSION

This is a case study conducted on 100 neonates presenting with various surgical conditions to Govt general hospital/Rangaraya Medical College Kakinada from July 2021 to December 2022.

Gastrointestinal diseases are the most common surgical conditions contributing to 62% of cases and is comparable with other studies. Ekwunife HO et al.[12] reported 64.4% of gastrointestinal cases, Abdulaziz O et al.[8] reported 69.1% of gastrointestinal cases.Most common condition requiring surgery involve the gastrointestinal tract, commonest being Anorectal Malformation and Intestinal atresias followed by Hirschprung's disease.

Male predominance is reported in this study which is 62%, females 38%. Ekwunife HO et al.[12] also reported male predominance as 65.8%, Hasan MS et al.[13] reported it as 64.4%.Outborn cases were dominant contributing to 67% of cases, inborn 33%, p-Value – 0.007.Out of 33 inborn cases 30 had good outcome, compared to 23 out of 67outborn cases.Outborn cases are associated with poor outcome due to late presentation, poor transportation, and lack of vital data regarding mother and newborn which makes the situation worse. By the time patient reaches the centre, disease processes are often advanced, sometimes even landing in irreversible states. Inborn babies have better access ti surgical and intensive care. Furthermore, delivery at a tertiary hospital reduce the need for transportation of critically ill newborns. Ugwu RO et al[21]. reported 79.3%outborn cases, 20.7% inborncases and reported mortality of 42.6%.Outborn caseswere associated with higher mortality, which can be comparable with other studies.

Good outcome is associated with mean birth weight of 2.8, poor outcome with mean weight of 2.2, p-Value –<0.01. In a study reported bySaggers R T et al.[22] good outcome is reported with birth weight of 2.2 and poor outcome with weight of 1.722, p-Value - <0.001.Hence, birth weight plays a significant role in outcome in both our study and the study it is compared with. Low birth weight is a major determinant of neonatal mortality which was recognised in 1930. Yllpo, Finnish Paediatrician reported that infants with weight less than 2.5 kg were at increased risk of death.

In our study, good outcome is associated with mean admission weight of 2.7, poor outcome with 2.1, with significant p-value of 0.0005.Manchanda et al.[14] reported good outcome with admission weight of 2.44 and poor outcome with 2.18, p-value of 0.0030. However, mortality is independent of weight of neonate if the organ systems are mature and proper care is provided to the neonates.Gestational age of 35.8weeks is associated with good outcome, 33.6 is associated with poor outcome,p- value of 0.002 . Manchanda et al.[14] reported good outcome with gestational age of 38 ± 1.67, poor outcome with 36.97 ± 2.13, p- value 0.0007.Mortality is inversely related to Gestational age. Higher mortality in preterm babies can be attributed to their immature physiological functions which makes them more susceptible for developing sepsis. Good outcome and poor outcome are reported with mean age of 4.3 days and 5.5 days respectively, with p-value of 0.293. Manchandaet al.[14] reported mean age of 3.5 with good outcome, 2.4 with poor outcome, p-value of 0.1308. Hence, age at admission have no significant effect on mortality as in previous studies.

In this study, associated anomalies were reported in 21% of cases with significant effect on mortality. Virupakshappaet al.[23] reported associated anomalies in 39% of cases, and Catre D et al.[24] reported in 11% of cases. Associated anomalies can be the cause of death, rather than the condition for which the neonate has been operated.

11 cases (11%) are ventilated preoperatively, of which 9 were associated with poor outcome, p-Value 0.0005. Saggers RT et al.[22] reported high risk of death, p-value of 0.014 for cases receiving preoperative resuscitation.Preoperatively ventilated cases are associated with increased risk of mortality because of compromised general condition even before the surgery. Added risk of general anesthesia and surgical stress makes the condition worse. All the ventilated cases were outborn which indicates that the neonate is in a critical condition before reaching the hospital. It can also be attributed to late referrals and delay in diagnosis. In this study, majority of ventilated cases are esophageal atresia with tracheoesophageal fistula. Out of 11 cases, 7 cases were died. Ventilatory support prior to abdominal surgery increases the risk of postoperative acute kidney injury[31]. Association between the two could be related to hypotension, decreased renal perfusion and inflammation. It is also postulated that higher airway pressure during ventilation can decrease renal perfusion.

In our study, good and poor outcomes are reported with mean heart rate of 134.8 and 146.4 respectively, with significant p-Value of 0.0005. Manchandaet al.[14] reported good and poor outcomes with 141.83 and 151.79 respectively, with significant p-Value of 0.0001.Presence of tachycardia is a significant predictor of mortality. Altered in any stress, fever, hypothermia, CNS depression secondary to hypoxia or otherwise. Good and poor outcomes are associated with a mean respiratory rate of 37.5 and 49.2 respectively, p-Value of 0.0005. Manchanda et al.[14] study reported good outcome with 36.07 ± 12.22 and poor outcome with 46.91 ± 16.69, p- Value 0.0000. Respiratory rate may increase in cases of premature lungs, pneumonia, increased oxygen demand (sepsis). The presence of respiratory distress was found to be a significant predictor of mortality. This is particularly important in cases of esophageal atresia with respiratory distress.

Good outcome is reported if mean BP is 45.8 and poor outcome with mean BP of 43.2, p-Value 0.097. Manchandaet al.[14] reported good and poor outcomes with mean BP of 48.28 ± 7.02 and 44.41 ± 7.95, p-Value 0.0015. Mean blood pressure was a significant predictor of mortality along with tachycardia.

31 cases are associated with decreased/low urine output,out of which 19 cases are associated with poor outcome. 69 cases had good urine output, 7 of them had poor outcome, with significant p-value of 0.0005. Manchandaet al.[14] reported p-value of 0.0000. Acute kidney injury (AKI) occurs in one-third of critically ill infants in the neonatal intensive care unit (NICU) and causes four-fold increase in mortality. Its sequelae are not only limited to the kidney and it may increase the risks of intraventricular hemorrhage, respiratory failure and hypertension. Prematurity and low birth weight are associated with increased risk because of lower renal blood flow particularly in the first week of life, low nephron number& low glomerular filtration rates.Immature tubular function limiting urinary concentration leads to increased insensible losses and dehydration. Urine output was a significant predictor of mortality.

In this study, good and poor outcomes are reported with mean temperatures of 97.7°F and 97.3°F, respectively, p-Value of 0.031. Manchandaet al.[14] reported good and poor outcomes with 97.43 ± 1.51 and 96.51 ± 1.70 respectively, p-value of 0.0005. Hypothermia is a significant predictor of mortality. A relatively small drop in temperature can result in a marked increase in oxygen consumption. Anaesthesia inhibits heat producing and conserving mechanisms making the neonate more prone to hypothermia which can cause increased intraoperative blood loss[32]. Hence, measures msut be taken to prevent hypothermia and to keep the baby warm.

Good and poor outcomes are reported with mean hemoglobin of 13.1 and 10.7, respectively, p-value of 0.0005. Kumba C et al.[25] reported that preoperative hemoglobin levels were negatively correlated with length of hospital stay, p-value <0.0001. Preoperative hemoglobin is a significant predictor of mortality as it effects the oxygen carrying capacity. Which in turn effects the outcome of surgery in terms of wound healing, duration of hospital stay.In this study, good and poor outcomes are correlated with mean total counts of 11526.5 and 13493.8, respectively, p-value of 0.228. Manchanda et al.[14] reported good and poor outcomes with 12181.87 and 11700, respectively, p-value – 0.5847.Preoperative total counts has no statistical significance which can be explained by the immature host defense mechanisms.

Good and poor outcomes are correlated with mean platelet count of 2.0 and 1.3 lakhs/cumm respectively, p-value of 0.003. Manchanda et al.[14] reported good outcome with 2.21 ± 1.07 and poor outcome with 1.84 ± 0.98, p-value of 0.0271.Risk factors for Neonatal Thrombocytopenia include maternal, perinatal and neonatal[33]. Neonatal factors include sepsis, necrotisingenterocolitis, toxoplasmosis, rubella, cytomegalovirus and herpes virus (TORCH) infections, asphyxia, neonatal immunologic disorders, chromosomal disorders and metabolic diseases. Thrombocytopenia increases the risk of bleeding especially intracranial hemorrhage into the intraventricular and periventricular space. Risk is particularly high in premature neonates.

In this study, good and poor outcomes are reported withmean CRP of 13.5 and 28.3, respectively, p-value of 0.005.Bacterial infection stimulates hepatocytes to produce CRP, a clinical marker for host pathogen interaction. Half-life is less than 3 days, with successful therapy rapid fall is seen. Helps to detect early sepsis when combined with total

counts. High preoperative CRP levels in this study could be due to high levels of inflammatory responseaggrevated by late presentation. Good and poor outcomes are associated with mean GRBS of 112.1 and 97.5 respectively, p-value 0.003. Manchanda et al.[14] reported good and poor outcomes with 69.64 ± 26.89 and 56.79 ± 15.68 respectively, p- value of 0.0010.Hypoglycemia is a significant prognostic marker.

Good and poor outcomes were reported with a duration of surgery of 106.4 and 136.9, respectively, p-value of 0.001 (significant).Zhang M-Q et al.[27] reported a correlation between the duration of surgery with duration of hospital stay; prolonged duration of surgery is associated with long duration of anesthesia and increased risk of hypothermia, bleeding, and sepsis with significant p-value of < 0.001.Zhao J et al.[28] reported that time of surgerymore than 60 minutes is associated with an increased risk of hypothermia, p-value <0.001.In this study, good outcome is reported with mean blood loss of 10.4 ml and poor outcome with 15.6, p-value <0.001. ZhangM-Q et al.[27] reported good outcome with blood loss of 1.22 ± 1.65 and a poor outcome with 2.30 ± 2.70, p-value of 0.01. Increased blood loss is associated with the increased need for transfusion. Blood transfusion causes intraoperative hypothermia, which inturn increases the risk of bleeding and sepsis. Insulated infusion devices should be considered for preventing hypothermia.

6 out of 33 clean cases, 12 out of 46 clean-contaminated, 8 out of contaminated cases are associated with poor outcome in this study, p-value of 0.266.Davenport M et al.[29] reported the contaminated wounds infection rate as 20.7%, whereas for clean wounds it was 11.1% with significant p-value <0.001. Contaminated cases were associated with increased risk of wound infection. Wound infection is also influenced by length of the wound and duration of the surgery.In this study, postoperatively extubation was not done in 27 cases corresponding to 27%, p-value of 0.0005.Abdulaziz O et al.[8] reported the need for postop ventilation in 7.5% of cases. In a study conducted by Iqbal A[11] et al. there was a significant difference in mortality rates between those who need postoperative ventilation and those who do not need postoperative ventilation.

In this study, postoperative vasopressor need was there for 28 cases, of which 22 cases are associated with poor outcomes, p-value of 0.0005. Zhao J et al.[28] reported vasoactive drug requirement in 6.98% of normothermic patients, and 15.42% of hypothermic patients, p-value of 0.040. Need for vasopressor in the postoperative period has a significant effect on mortality.Postoperatively, good outcome is reported with a mean temperature of 36.5 and bad outcome with 35.8, p-value being 0.0005. Zhao J et al.[28] reported hypothermia in 82.83% of neonates and is associated particularly with prematurity, surgery time more than 60min, receiving fluid more than 20ml/kg and in cases operated on an emergency basis.

Good and poor outcomes are associated with mean TC of 10310.0 and 15189.2, respectively, p-value of 0.006. Good and poor outcomes are associated with mean CRP values of 11.2 and 69.3, respectively, a p-value of 0.0005. Levy M et al.[26] reported an increased risk of sepsis and mortality with a CRP of 103.2 ± 73.5 mg/L. patients with normal preoperative CRP levels can have elevated CRP in the first 48 hours after surgery, which then gradually decreases. Particularly high after emergency laparotomy. CRP estimation can help in identifying patients who are at risk for development of postoperative surgical site infection.Good and poor outcomes are reported with mean platelet count of 1.9 and 0.8 respectively, p-value of 0.0005. Manchandaet al.[14] reported that low platelet count is significantly associated with mortality.

Positive culture was reported in 17 cases i.e 17 %,withklebsiella being the most common, reported in 10 cases, followed by E.coli (2), Enterococcus (1), Acinetobacter (1), Staphylococcus aureus (1), Streptococcus (2). Levy M et al.[26] reported Escherichia coli (22%), Staphylococcus epidermidis (19.5%), Staphylococcus aureus (14.6%), Enterobacter cloacae (9.8%).Iqbal A et al.[11] reported a positive culture rate as 13.8%.

Out of 100 cases, 74 cases survived and the mortality rate was 26%, and mortality is higher for patients who had EA-TEF repair.IqbalA et al.[11] reported a mortality of 31.5%, and Prasad T et al.[30] reported a mortality of 42.1%.

SUMMARY

100 neonates requiring surgical intervention admitted into Govt general hospital/Rangaraya Medical College Kakinada, were studied. 62 were males, and 38 were females, with male predominance; 67% were outborn and were referred to our centre for surgical intervention. Prematurity with gestational age less than 34 weeks, and birth weight less than 2.5kgs is associated with poor outcome in this study.

In this study, Delayed presentation with a mean duration of 5 days was reported, by that time surgical neonate is nutritionally compromised, resulting in the development of resistant overwhelming sepsis. Cases requiring preoperative resuscitation with endotracheal intubation are associated with poor outcome, also,Associated anomalies were reported in 21% of cases.Tachycardia with a mean heart rate of 146 and tachypnea with a mean respiratory rate of 49, low platelet counts, high CRP, hypothermia, prolonged duration of surgery, postop ventilator and vasopressor requirement are associated with poor outcome in this study.

Scope of this study:
Since out born cases are presented late and are associated with poor outcome, it is necessary to educate paediatricians, Obstetricians and other staff. Protocols should be made regarding the criteria for referral, when and where to refer, knowledge about the common surgical conditions and the treatment options available, and neonatal surgical screening. Hygienic practices during delivery, postpartum, and cleanliness while handling a newborn should be encouraged.

Limitations of this study:

- Since a wide spectrum of cases have been included there will be inherent bias in certain parameters with respect to outcome.
- Lack of vital data regarding mother and newborn as majority of cases were outborn.

PROFORMA
Hosp. No
Sex of baby
Diagnosis

PREOPERATIVE VARIABLES
Birth weight
APGAR
Admission weight
Place of delivery-Inborn/Outborn
Gestational age
Age at presentation
Associated anomalies
Ventilated

EXAMINATION ON ARRIVAL
HR
RR
Mean BP
Urine Output ml/Hosp. No
Sex of baby
Diagnosis
PREOPERATIVE VARIABLES
Birth weight
APGAR
Admission weight
Place of delivery-Inborn/Outborn
Gestational age
Age at presentation
Associated anomalies
Ventilated
EXAMINATION ON ARRIVAL
HR
RR
Mean BP
Urine Output ml/kg/hr
Temp
Platelets
CRP
Hb
WBC
Altered coagulation
POSTOPERATIVE
Extubation
Temperature after surgery
Vasopressors
Time to enteral feeds
Platelets
CRP
Lactate
Positiveblood culture
Time to discharge

Other complications
Significant imaging/radiological findingskg/hr
Temp
Platelets
CRP
Hb
WBC
Altered coagulation

POSTOPERATIVE
Extubation
Temperature after surgery
Vasopressors
Time to enteral feeds
Platelets
CRP
Lactate
Positiveblood culture
Time to discharge
Other complications
Significant imaging/radiological findings

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