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Neonatal Surgical Emergencies at Moi Teaching and Referral Hospital in Eldoret -Kenya.

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Background: Success in the management of neonatal surgical emergencies depends on prompt diagnosis, adequate resuscitation, good nursing care, safe anaesthesia and competent surgery. Considering that centres for paediatric surgery are few in the developing world, an added requirement is application of the principles of neonatal transport, when neonates are transported to these centres from wherever they are born. These are the challenges that Moi Teaching & Referral Hospital (MTRH) faces in the provision of emergency service to neonates. The hospital serves the Western Kenya region with a population of about 15 million. This study was aimed at determining the pattern and the outcome of neonatal emergency surgery at MTRH.

Methods: This was a retrospective descriptive study done at The Moi Teaching & Referral Hospital, Eldoret-Kenya. The study population included all neonates with emergencies managed by the paediatric surgical service between July 2003 and July 2006. Data was obtained from the theatre register and patients' files.

Results: Sixty nine neonates were operated between July 2003 and July 2006 but only 56 files were completed for analysis. Of the 56 neonates, 35 were male and 21 female (M: F ratio of 1.7:1). The median age of presentation was 3 days with a range of 1 – 22 days. Referrals represented 32 (60%). The leading three diagnoses were anorectal malformation 19 (34%) intestinal atresia 8 (14%) and anterior abdominal wall defects 7 (13%). 14 (25%) of the neonates had low birth weight. Application of principles of neonatal transport was poor. Inadequacy of fluid therapy was noted in 26 (45%) of the neonates. Challenges of providing parental nutrition were encountered in 11 (20%). Sepsis was the leading complication and major cause of mortality. Overall mortality was 18 (24%) but was 14 (44%) among the referrals.

Conclusion: Morbidity and mortality was high in the management of neonates with surgical emergencies. Reversing the trend will require: early referral and presentation; overcoming the challenges of providing infrastructure that will enable good nursing care, and improving neonatal transport in the region.

Introduction

Surgery and anaesthesia of neonates evokes responses that are unique. Overriding questions in the family concerned are: whether the infant will survive the stress of surgery and anaesthesia, and whether the one with the prevailing, particularly congenital, anomaly will revert to normal. Just as infant mortality rate measures the quality of life and health care in a country, success of neonatal surgery is an audit of health delivery by any institution. The challenges of offering neonatal surgical service in Western Kenya are similar to other parts of the developing world. Limited human and material

resources, poor infrastructure and problems of poverty have had a negative impact on its implementation¹.

MTRH is the second national referral and university teaching hospital in Kenya, serving the western region with a population of about 13 million, mainly rural peasant farmers. Development of infrastructure has not kept pace to match the status and expectations. Before July 2003, neonatal surgery in Eldoret was a narrow range of procedures by general surgeons. Since then there has been an increase in the range and volume of neonatal surgical procedures occasioned by the presence of a paediatric surgeon. As

expected challenges have emerged threatening the establishment of this service.

This study was done to assess the outcome of emergency neonatal surgery at MTRH with a view to providing solutions for improved care

in the years to come. The specific objectives were to determine the pattern of neonatal emergencies, assess the management of these emergencies and determine the outcome.

Materials and Methods

This retrospective study was carried out at MTRH. The study population included all neonates with emergencies managed by the paediatric surgical service between July 2003 and July 2006. Secondary data was sourced from the theatre register and patients' files.

Table 1. Anomalies and Overall Mortality.

Diagnosis	Total Number	Mortality	%
Referrals	32	14	44
Anorectal Malformation	19	6	32
Gastroschisis	7	4	57
Intestinal atresia	8	3	38
Hypertrophic pyloric stenosis	5	0	0
Intestinal Malrotation	1	0	0
Gastro-intestinal tract perforation	4	2	50
Oesophageal atresia	3	2	67
Hirschsprungs disease	4	1	25
Sacrococcygeal teratoma	1	0	0
Incarcerated hernia	4	0	0
Overall	56	18	24

Table 2. Weight distribution of neonates presenting for emergency surgery at MTRH

Weight (kg)	Number	Percentage
> 3 kg	21	37.5
2.5 – 2.9	21	37.5
2.0 – 2.4	6	11.0
1.5 – 1.9	8	14.0
Total	56	100.0

Files with inadequate information were excluded from the analysis.

Results

There were 69 neonatal surgical emergencies (operations) representing 10% of all paediatric surgical operations done by the paediatric surgical service. Of these only 56 files were complete for analysis.

Of the 56 neonates, 35 were male and 21 female giving a male to female ratio of 1.7:1. The median age of presentation was 3 days with a range of 1-22 days. Referrals from other hospitals were 32 (60%). Ten (34%) of the referrals were delivered at home then presented to peripheral health units. The pattern of anomalies and weight distribution are shown in tables I & II respectively.

Problems encountered in the referral and transfer process

Applications of principles of neonatal transport fell short of the expected in a significant number as shown below:-

- 14 (44%) did not have nasogastric tube
- 15 (45%) did not have venous access line
- 32 (100%) did not have urethral catheter
- 32 (100%) did not come in transport incubators. Warmth provided by improvised clothing
- 15 (46%) were severely dehydrated.

Complications

- Sepsis was a complication in 10 (15%) and was the major cause of mortality
- Wound dehiscence occurred in 3 (5%)
- Leaking anastomosis in 2 (25%) of ileal atresia
- Overall mortality of 18 (24%) Case specific mortality is shown in Table 1.

Discussion

A neonate with a surgical emergency presents formidable challenges in patient care, particularly in a resource poor environment like MTRH. Evolution of sophisticated neonatal intensive care units (NICU), early detection of numerous anomalies by prenatal ultrasound, development of high risk obstetric centres, and development of parenteral nutrition² in developed economies uplifted the service to newer levels enabling survival of neonates with congenital anomalies and surgical problems that were initially considered fatal. In our environment, outcome of neonatal surgery has been disappointing^{3,4} for the above developments are in rudimentary stages or non-existent. It is noted with concern that over the past decade, neonatal mortality rate (NMR) and peri-natal mortality (PMR) in developing countries, especially in Sub-Saharan Africa, has failed to decline substantially⁵. This stems from problems of inaccessible antenatal and

qualified obstetric care for the rural majority, poor community support services for neonatal care and inefficient and weak referral systems. A significant proportion of neonates were delivered at home and went through the inefficient referral system with poor application of principles of neonatal transport. The unskilled environment in which they were delivered does not lend itself to appropriate provision of initial care for a neonate with a surgical emergency. These factors have a synergistic effect compromising the care and survival of neonates hence the higher mortality among referrals. It is worrying to note that over the period of the study only a small number of neonates requiring to be referred e.g. with oesophageal atresia, were seen at MTRH when by incidence a bigger number was expected. This supports the assertion that the number of neonates requiring treatment and eventually receive it are only but a tip of the iceberg⁵. Most neonates born in the third world do not receive medical attention.

The need for elevation of antenatal care incorporating pre-natal diagnosis is evident. It is easier and hardly a challenge to refer a mother with the foetus carried in its 'natural incubator' – the uterus, to deliver in a centre where neonatal surgery can safely be done. There is also need to improve neonatal services in the entire region to minimise emergency neonatal transfers. This will lessen the strain on the weak referral system. There are surgeons in most of the hospitals in the region who have the capacity to offer a wide range of emergency neonatal surgery but anaesthetic services are a big let down. Most of the peripheral hospitals do not have anaesthesiologists to deal with challenging anaesthetic requirements.

Neonates have the greatest risk of peri-operative adverse events⁶ and many technical problems are encountered. Lack of appropriate sized catheters, intravenous lines, endotracheal tubes, electric blankets, accurate drug delivery systems during anaesthesia, well serviced machines and support services further challenge the ability to safely

anaesthetize a neonate in peripheral hospitals. Envisaged improvements to make surgery in the region safe demands that anaesthetic services are improved both at MTRH and in peripheral hospitals. Paediatric anaesthesiologists are the ultimate requirement to oversee the implementation of necessary changes but in the interim period general anaesthesiologists are a necessity. Other than being able to meet the challenges, they have the ability to apply safe procedures like regional anaesthesia (e.g. caudal) enabling a wide range of surgical procedures to be performed.

Peri-operative care of surgical neonates at MTRH still requires attention and financial input. A neonate friendly infrastructure that will permit optimum monitoring, post-operative pain management, provision of parenteral nutrition when needed, active management of accessories like nasogastric tubes, provision of optimum temperature, etc, is urgent. It is no mean task but the process has begun and requires to be kept on course. A neonatal unit, under construction, incorporating a neonatal intensive care unit (NICU) will uplift performance outcome. The enthusiasm of staff in the overcrowded wards is a strong point, but a paediatric surgical team with the skills commensurate with neonatal surgical problems needs to be developed through training.

Improving neonatal transport in the region is the singular task that will be beneficial in the short term. A resource poor environment is no hindrance to applying the principles as required⁷. An attitude change correctly attuned to applying the knowledge for the betterment of neonates needs to be cultivated in the health workers to go an extra mile in service provision, in advocating for the allocation of some of the resources towards acquiring Nasogastric tubes, catheters, etc and in innovation to overcome the perceived and real challenges. This is more apparent now considering that new diseases are emerging and confusing the horizon further

with formidable challenges. HIV/AIDS and associated surgical complications have not spared neonates.

Conclusion

Emergency neonatal surgery at MTRH is associated with high morbidity and mortality. Appropriate steps need to be taken to overcome the challenges that threaten its development in MTRH and entire region to improve outcome. Human resource development, neonate friendly infrastructure and allocating the rightful share of the existing resources towards service to children will uplift the service to satisfactory levels despite this being a resource poor environment. Money spent on a neonate with a surgical problem who survives is a worthwhile investment, in effect; it translates into having bought 70 years of useful life to the community. This should therefore be one of the factors to be considered during allocation of resources available for health care.

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