

Research Article

A retrospective (2004-2013) and prospective (2014-2015) study of new born with special reference to anorectal malformations over a period of 10 years at a tertiary care centre

Shashi Shankar Sharma^{1*}, Arif Ahmad Ansari¹, Kartikeya Shukla¹, Ashok Laddha²,
Brijesh Lahoti²

¹Department of Surgery, MGMMC & MYH, Indore, India

²Department of Pediatric Surgery, MGMMC & MYH, Indore, India

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*Correspondence:

Dr. Shashi Shankar Sharma,

E-mail: drshashisharma@gmail.com

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ABSTRACT

Background: A surgical audit of neonates with anorectal malformation in advanced tertiary neonatal care unit.

Methods: A retrospective (2004-2013) and prospective (2014-2015) audit of medical records of newborn with GIT disorders admitted in a tertiary care center of central India. The trends analyzed for the duration based on gender, region and birth weight and data base was generated depicting the burden of disease in the region. The data base for the prospective study was also compared with a tertiary center from Nigeria.

Results: Total 3309 admission included 73.56% (2438) patients of GIT diseases. Congenital anomalies were the most common cause in each category, major part being anorectal malformation (727) and trachea-esophageal fistula (730). Out of 727 admissions, 651 neonates were operated & total 1194 deaths recorded during this audit year 2004 to July 2015. Majority of new born admitted with were low birth weight male from rural skirts of this region. 509 have associated anomalies and 218 isolated ARM.

Conclusions: There is significant increase in admissions in last decade with triple fold increase in GIT disorder and twice rate in anorectal malformation substantially increasing onwards. The quality of management has to continue further to achieve parity with international standards, as there is lack of antenatal screening and details of any antenatal checkup are scarce, for congenital anomalies at primary level. Early recognition, risk stratification of the baby and timely referral to higher pediatric surgery units is the way forward.

Keywords: Surgical audit, Gastrointestinal disorders of new born, Anorectal malformations

INTRODUCTION

The incidence of anorectal malformations (ARMs) varies from 1 in 1500 to 1 in 5000 live births.¹⁻⁵ The surgical and medical management of patients with these malformations can be complex, especially when one considers the high frequency of concomitant anomalies that occur with ARMs. This frequency of additional anomalies in patients with ARMs ranges from 40% to 70%.^{1,2,4,5} In many parts of the developing world, there

are several challenges with neonates requiring surgeries. Some of these challenges include delivery outside hospital, delayed referral, poor transportation, and lack of appropriate personnel and facilities for intensive care.⁶⁻⁸

In continuum this study shares our experience on the pattern of anorectal malformation admission in our region of central India at a tertiary referral centre. We have also focused on status of referral pattern, antenatal and postnatal duration of neonatal care as per principles of

emergency care on newborn, based on details in the clinical data available at the time of admission of such newborn in emergency and routine hours. Our hospital is one of the 5 tertiary health institutions in the state. The hospital receives referrals for most elective and emergency surgical conditions of newborn from all over the state.

METHODS

In this study, all neonates (Age 0 to 28th day of life) admitted in routine & emergency hours in pediatric surgery unit of surgery department of MYH, Indore in duration of year 2004 to July 2015 participated has 10 year retrospective & 1 prospective groups with special reference to GIT disorders. Data was retrieved from medical records of the hospital as gender, gestational age, birth weight, disease diagnosis, surgical intervention done & patient outcome between the date of admission to date of discharge of the patient. Region wise distribution was defined as per the address of the patients in the records/referral slips. The birth weight was defined as per Indian standards of <2.5 kg birth weight as LBW & normal birth weight as >2.5 kg at birth. The burden of these surgical diseases was expressed as mortality rates, proportional mortality rates & case fatality rates with trends over the same period.

The records with inadequate information were excluded from the audit. The data retrieve in the audit were also compared with other tertiary centers (Nigeria Part-Harcourt 2014) for incidence (admissions), case fatality rates, intervention & outcome parameters.

RESULTS

The total number of admissions in the audit period from 2004 to 2015 was 3309 patients. Overall most common system contributing admissions was gastrointestinal tract disease of neonates. Total numbers of admissions in GIT category was 2438 (73.56%) patients.

Table 1: Anorectal malformations distribution.

Arm with anomalies	Number of patients (%)
GUT	200 (40)
CVS	100 (20)
GIT	153 (29)
RESP	56 (11)
Total	509 (70)
Arm isolated &/or unspecified	218 (30)

Epidemiology and audit of anorectal malformations

The incidence of anorectal malformations from year 2004 to year 2014-15 (Figure 1).

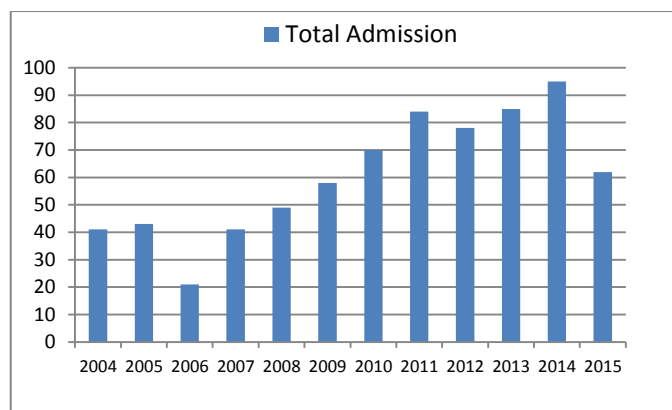


Figure 1: Incidence of anorectal malformation.

Table 2: Arm types and gender wise distribution of disease.

Arm type	Number of patients (%)	Males (%)	Females (%)
Low	247 (34)	162 (35)	85 (33)
Intermediate	73 (10)	37 (5)	36 (13)
High	400 (55)	277 (60)	123 (45)
Cloaca & unspecified	10	NA	10 (4)
Total	727	462	265

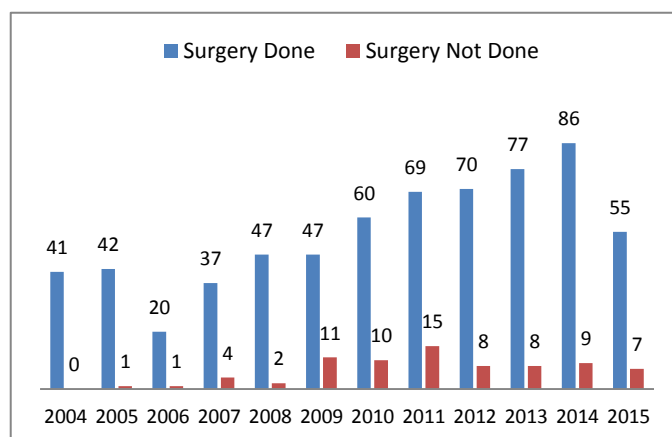


Figure 2: Interventions on anorectal malformation in ten years.

Total 727 patients had anorectal malformation (462 male & 265 female, 627 rural & 100 urban, 652 LBW & 75 normal weight) out of which 651 surgeries were done (510 in retrospective period and 141 in prospective period), 561 patients were discharged (443 in retrospective and 118 in prospective period of this audit). Total 155 mortalities 118 were in retrospective and 37 in prospective period of this audit.

Burden of disease: mortality rates, PMR and CFR over the years (Figure 3-5)

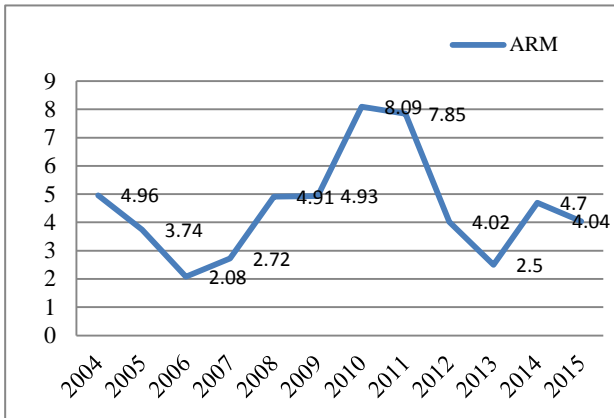


Figure 3: Mortality rate of ARM.

There was a peak in mortality rate in year 2010 (8.09) with decline registered in 2015 to be 4.04.

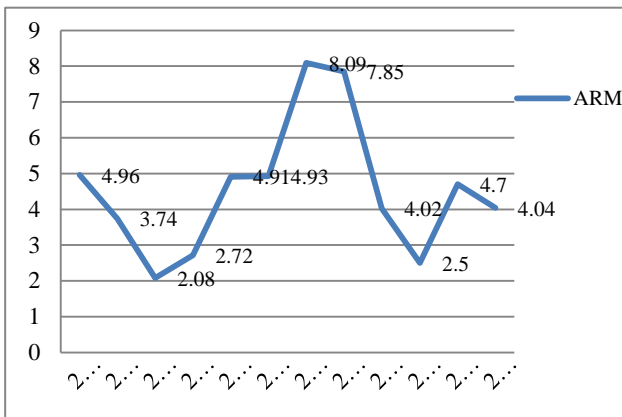


Figure 4: Disease specific mortality rate of ARM.

Audit revealed highest disease specific mortality rate in year 2010 declining gradually to 4.04 in year 2015.

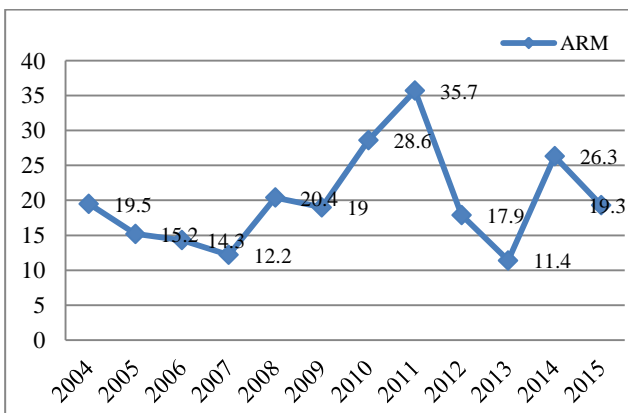


Figure 5: Case fatality rate of ARM.

Case fatality rate had two peaks in year 2010-2011 & 2014 and which declined in year 2015.

DISCUSSION

Overall most common system contributing admissions was gastrointestinal tract disease of neonates (73.56%). The number of admissions to neonatal unit of pediatric surgery dept. in our hospital has tripled in last 10 years. In 2004 there were 161 admissions comprising routine and emergencies, which has been increasing substantially over the last decade. In 2014, 533 patients admitted more than 3.5 times of year 2004 admission and till July in 2015 the toll has reached 297 and still increasing.

55% high type ARM with male preponderance (60% male), 34% low variety with 35% males and 33% female patients. Here high type having male predominance, and overall predominance of male ARM in the study. Majority cases belong to the rural areas of the region with twice in number, were low birth weight.

ARM had PMR 13% and CFR 21.3%. The mortality rate showing a decrement from 4.96% in year 2004 to 4.04% in year 2014 although there was hike in admission 41 in year 2004 to 62 till July in year 2015. In year 2013-2015 the incidence of disease (19.7%) was higher as compared to data of JRH (UK) (4.7%) and KCMC (Africa) (9.5) available for year 2003-2005. Case fatality rate of BHU audit was 6% but it was 19.98% in this region.

Comparison of surgical audit: Indore (2014) and Nigeria part-harcourt (2014)

We also compared our surgical audit of year 2014 with surgical admission in newborn unit in Nigeria Part Harcourt year 2014 (Table 2).

Overall 440 patients admitted in our setup, 95 newborn had ARM 86 were operated, 68 discharged & 25 patients died. There were 2 neonates discharged against medical advice. In Nigerian report total 119 neonate admitted with surgical diseases out of which 13 newborn had ARM 10 were operated, 6 discharged & 4 patient died, 3 neonates discharged against medical advice. Proportional mortality rate observed in our audit was 12.25%, whereas in Nigerian study it was 11.43%. 95.53% neonates have surgical intervention in our setup whereas 77% neonates were operated in Nigerian study. Case fatality rate for ARM in our centre and Nigerian centre were 26% and 31% respectively. The major cause of mortality includes delayed referral, poor recovery from anesthesia, uncontrolled sepsis, low birth weight and other associated congenital diseases.

The overall data suggests higher admission rate, surgical intervention and mortality rate at our setup as compared to Nigerian neonatal care center. We are having higher burden of ARM, as compared to Nigerian center (Table 3).

Table 3: Comparison of intervention of Indore and Nigerian centre.

No	ARM	Indore	Nigerian
1	Surgery done	86	10
2	Surgery not done	9	3
3	Discharge	68	6
4	Died	25	4
5	Dis. against advice	2	3
6	Total	95	13

The most common organ system that was affected by additional anomalies was the genitourinary system. Abnormalities in the genitourinary system were observed in 40% of patients with ARMs. It is well known that additional congenital anomalies are often present in patients with ARMs, and it is these coexisting anomalies that account for the high morbidity and mortality associated with this condition.^{2-4,9} We observed 70% ARM cases with anomalies similar to literatures.^{1,2,4,5-10} The male-female ratio in this population was approximately 2:1, which is greater than the reported range of 1.2:1 to 1.8:1 in more recent studies.^{2-4,10} Additionally, high ARMs were more common in males than females. Other case series describe similar results, with the frequency of genitourinary anomalies ranging anywhere from 26% to 59% in patients with ARMs.^{1,3,4,11-14} Therefore, thorough evaluation of the genitourinary system in patients with ARMs is essential. Most authorities recommend a vesicoureterogram voiding cystourethrogram and ultrasound to study the kidneys and bladder in all patients with ARMs.^{3,8,11-14}

It is well established that high ARMs are more common in males than females and are also more frequently associated with other congenital anomalies than low lesions.^{1-4,10} In our study, high ARMs were observed in 60% of males (n=277) and 45% of females (n=123). Results of χ^2 analysis indicated that patients with ARMs and additional anomalies were more likely to have high lesions than patients with isolated ARMs (P=0.001). This is in line with contemporary thought that high ARMs are more complex lesions that are more likely to be accompanied by anomalies in other organ systems also forming between gestational weeks 4 and 8 due to some teratogenic event.⁵ Anorectal malformations are relatively common congenital anomalies that are frequently associated with other congenital anomalies. It is these associated anomalies that account for most of the morbidity and mortality that is associated with ARMs.

CONCLUSION

This study demonstrates the extent and spectrum of anorectal malformation in newborn in this part of India and highlights the need for newborn surgical care in developing countries. There was an increase in the admissions three folds over the past years. Anorectal

malformations are relatively common congenital anomalies.

Therefore, a thorough evaluation of infants born with ARMs is warranted to minimize these complications. The overall mortality rate remained more or less the same i.e. 9%. The major cause of mortality includes poor recovery from anesthesia uncontrolled sepsis, low birth weight and other associated congenital diseases. Significant improvement has been achieved in the outcome of neonates with ARM in pediatric surgery over the last decade. This development has to continue further to achieve parity with international standards. In our region there is lack of antenatal screening protocols and details of any antenatal checkup are scarce, regarding congenital anomalies at primary health care setting. Early recognition, risk stratification of the baby and timely referral to higher pediatric surgery units is the way forward.

Hospital admission data can be a valuable tool for assessing the epidemiology of diseases within populations. With determined, systematic and wide-ranging data collection, we can develop substantial insight of pediatric surgical disease trends.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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