Original Article

Pediatric Surgery in Rural Government Medical College: A Cross-sectional Study of Admission Pattern and Need of Super Speciality Services

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Abstract

Background: The aim of the study was the admission pattern of elective and emergency patients admitted in the paediatric surgery department to highlight the importance of paediatric surgery super speciality in the rural regions. **Materials and Methods:** The study was a retrospective cross-sectional study over a period of 1 year from 1st March 2021 to 28th February 2022. All the complete records of patients admitted in paediatric surgery (age ≤15 years) from 1st March 2021 to 28th February 2022 were included in the study. The collected data were analysed using the Statistical Package for the Social Sciences (IBM SPSS 26.0, Armonk, NY, USA: IBM Corp.). Descriptive and analytical methods were utilised. $P < 0.05$ was considered statistically significant with 95% confidence interval. **Results:** A total of 155 patients were admitted, the mean age was 6.5 (standard deviation ± 4.7) years and male-to-female ratio was 2.5:1. $n = 96$ were elective admissions while $n = 59$ were emergency admissions. Most common elective surgery performed was hernias (17%) while most common emergency surgery performed was appendicectomy (9%). Trauma represents 11% admissions. The most common cause of non-operative admission was non-specific abdominal pain abdomen (8.4%). Mean pre-operative stay and total hospital stay for elective surgeries compared to emergency surgeries were statistically significant ($P < 0.05$). No surgical site infection observed among emergency and elective cases. **Conclusions:** In our study, the most common causes of admissions were hernia, appendicitis, trauma and non-specific abdominal pain requiring super speciality services in the rural regions.

Keywords: Paediatric surgeon, rural regions, specialised care

Introduction

Paediatric surgical care is often the only solution to paediatric surgical diseases promising cure or limit further damage, disability and death.[1] Paediatric surgical diseases are inadequately addressed globally because of the lack of paediatric surgery specialisation which is more so in developing countries and require trained surgeons in this specific field. In India, reported paediatric surgeons per hundred thousand population is 0.28 against the recommendation of at least 1 per hundred thousand as by American Paediatric Surgical Association.[2] General surgeons can tackle simple surgical conditions such as appendix, hernia, burns, and suture debridement but still outcomes are better with paediatric surgeon care which is more so with new born and infant surgery. Both elective and emergency surgical conditions which require paediatric surgical care pose greater global burden of mortality and morbidity rates. These conditions are further worse in developing countries as surgical care provided by untrained general surgeons gives unsatisfactory results. The situation is unimaginable in the rural regions due to unawareness and non-availability of paediatric surgeons both in government and private practice, further most of these practitioners work in urban regions of country leaving a large paediatric population in the rural and remote areas unserved adding to hidden morbidity and mortality.[2-5] In

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developing countries, children constitute 50% share to the population burden but still childhood surgical conditions are neglected which need to be addressed. These paediatric surgical cases require special anaesthetic, pre-operative and post-operative care. They further need long follow-up care as these diseases affect children during development time. Data are lacking on the mortality and morbidity associated with the lack of paediatric surgical services and the burden of paediatric surgical diseases on the health system.[6] It is now known that surgical care in these patients is totally different from those of adults that requires team work of paediatric surgeons, anaesthetists, paediatricians and trained intensive care unit (ICU) care staff.[7] The lack of these factors impacts paediatric care outcome in terms of morbidity and mortality which is further worse for developing countries as there is the huge scarcity of trained team.[8] The health planners and implementers have been ignorant to paediatric surgical conditions, but it has been recently recognised that paediatric surgical conditions pose significant burden to community.[9] Increasing access to paediatric surgical care and management with specialised teamwork can reduce the paediatric age mortality and morbidity rate.[10]

Materials and Methods

The study was carried in our institute which is government tertiary care centre situated in rural region of Haryana, India. The hospital is teaching referral hospital with two paediatric surgeons. There are 11 beds which are for paediatric surgery patients out of which 5 beds are in paediatric ICU in sharing with paediatric medicine department and remaining 6 paediatric surgery ward beds are in sharing with general surgical ward. Surgical neonates were admitted in common medical neonatal ICU. The study was conducted to know the pattern of paediatric surgical admissions in rural tertiary care centre and highlight the importance of paediatric surgery super speciality in the rural regions of India. The study was retrospective cross-sectional study over a period of 1 year from 1st March 2021 to 28th February 2022. All the complete records of patients admitted in paediatric surgery (Age ≤15 years) during this period were included in the study. The patient's data in terms of age, sex, diagnosis, elective/emergency admission, pre-operative and post-operative stay and surgical site infection (SSI) were collected. The collected data were analysed using the Statistical Package for the Social Sciences (IBM SPSS 26.0, Armonk, NY, USA: IBM Corp.). Data were presented as mean and standard deviation (SD) for the continuous variable and as percentage for the categorical variables. The Chi-square test was done to find out association between the categorical variables. Fisher's exact test was done to find out association between the categorical variables when expected cell count <5. $P < 0.05$ was considered as statistically significant with 95% confidence interval.

Results

A total of 155 patients were admitted during the study period. The mean age of patients was 6.5 (SD ± 4.7) years. Youngest patient admitted and operated was 2 days old. Male ($n = 111$) to female ($n = 44$) patient ratio was 2.5:1 [Figure 1]. Twenty-seven per cent of patients were under 3 years of age and 30% patients were more than 9 years [Table 1].

79.4% patients were managed with surgery and 20.6% patients were managed conservatively. Among 155, $n = 96$

Table 1: Distribution of patients in each age group

Age (years)	Number of patients, *n* (%)
0-3	42 (27.1)
3-6	45 (29)
6-9	22 (14.2)
>9	46 (29.7)

Table 2: Diagnosis wise patients' distribution

Diagnosis	Frequency (%)
Appendicitis	14 (9.0)
Anorectal malformations	12 (7.7)
Brachial fistula	1 (0.6)
Cervical lymphadenopathy	1 (0.6)
Choledochal cyst	1 (0.6)
Cholelithiasis	4 (2.6)
Colostomy	1 (0.6)
Pelviureteric obstruction	1 (0.6)
Ectopic ureter	1 (0.6)
Empyema	2 (1.3)
Epigastric hernia	1 (0.6)
Exstrophy epispadias	1 (0.6)
Fistula in Ano	1 (0.6)
Hernia	26 (16.8)
Hirschsprung's disease	5 (3.2)
Hydrocephalous	2 (1.3)
Hypospadias	11 (7.1)
Meningomyelocele	6 (3.9)
Necrotizing enterocolitis	1 (0.6)
Necrotizing fasciitis	1 (0.6)
Neurogenic bladder	1 (0.6)
Pain abdomen	13 (8.4)
Penile retention cyst	1 (0.6)
Perforation peritonitis	3 (1.9)
Phimosis	2 (1.3)
Posterior urethral valve	1 (0.6)
Vesicoureteric reflux	1 (0.6)
Rectal polyp	1 (0.6)
Lower lip retention cyst	3 (1.9)
Subacute intestinal obstruction	2 (1.3)
Tracheoesophageal fistula	1 (0.6)
Sacrococcygeal Teratoma	2 (1.3)
Tongue tie	1 (0.6)
Trauma	17 (11.0)
Urethrocutaneous fistula	1 (0.6)
Undescended testis	10 (6.5)
Urinary bladder calculus	2 (1.3)
Total	155 (100.0)

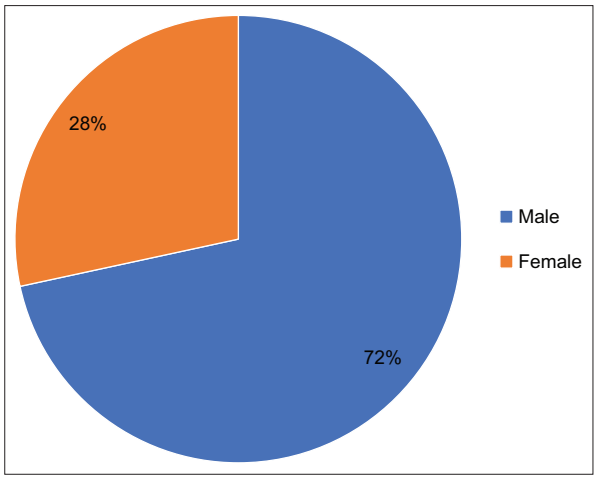


Figure 1: Gender distribution

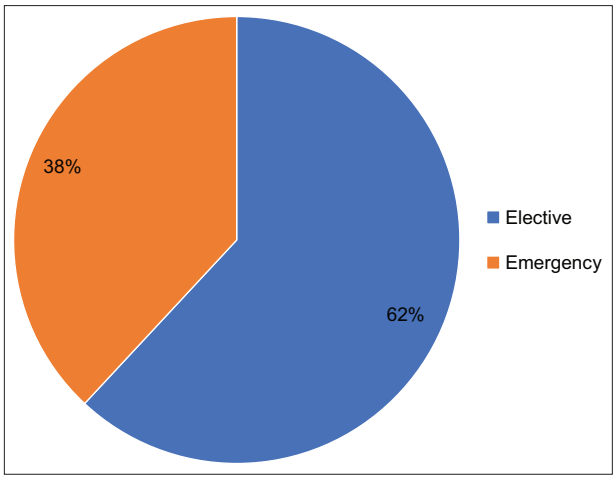


Figure 2: Distribution of surgical procedures

were elective admissions while n = 59 were emergency admissions [Figure 2]. The most common elective surgery performed was hernia 17% (n = 26) followed by anorectal malformations 7.7% (n = 12), hypospadias 7% (n = 11) and undescended testis (UDT) 6.5% (n = 10). While most common emergency surgery performed was appendicectomy 9% (n = 14). Trauma represents 11% (n = 17) admissions that includes fall down patients, road side accident and assault patients [Table 2]. One emergency patient of tracheoesophageal fistula repair expired on day 2 due to respiratory failure representing 0.6% mortality. The most common cause of non-operative admission was non-specific pain abdomen 8.4% (n = 13), constipation was major issue among these patients which resolved with conservative management

The mean pre-operative stay in elective surgery was 3.8 days whereas it was 1.4 days in emergency surgeries which was statistically significant ($P < 0.05$) while post-operative stay among elective and emergency cases is insignificant. Mean total stay in elective cases 7.6 days as compared to emergency cases 4.7 days which is statistically significant ($P < 0.05$). No SSI observed among the emergency and elective cases.

Discussion

In our study, boys are more affected than girls, although not statistically significant, reasons could be males being more affected by congenital conditions and trauma further male child preference of our Indian society.[11] The most common causes of admissions in our study were gastrointestinal problems, congenital anomalies and trauma similar to other studies.[12] Among trauma most of patients were fall down cases and road traffic accidents as seen by Asefa *et al*.[13] From congenital anomalies, inguinal hernias were the most commonly encounters.[14] The second most common congenital malformation was anorectal anomalies rather than meningomyelocele, likely because of referral to neurosurgeon by local medical practitioners available in rural region. In our study, no SSI was observed whereas Gerber *et al*. in their study observed 2.5 SSIs per 1000 surgical encounters: 2.9 per 1000 at the hospital-based facility and 1.6 per 1000 at the ambulatory surgical facilities.[15] The reasons could be clean elective surgery cases and low patient burden which decrease cross contamination in our study. One death observed in patient operated case of tracheoesophageal fistula on day 2 postoperatively due to respiratory failure giving mortality rate of 0.6% lower than Osifo and Aduwa where 3% mortality rate was reported.[11] This could be due to more elective surgeries and low infection rate due to limited operation days (two table per week). The pre-operative stay of elective patients when compared to post-operative stay was statistically significant which was due to day care procedures (hernia, UDT and node biopsy) which were admitted for surgery because of single paediatric surgeon, limited operation days, anaesthesia aspects, lack of transport facilities in this rural region so unable to come as day care procedure. When we calculate by minimum daily wage loss (400 Indian rupees per day), the elective patients have to bear an average loss 1520 Indian rupees. The reasons are single paediatric surgeon so limited operation days highlighting need of more paediatric surgeons and operative tables. Total duration of hospital stays of elective patients when compared with emergency patients the difference was statistically significant reasons could be early intervention in emergency admissions when required and conservative management in some cases and long pre-operative stay of elective patients.

The limitations in our study were this was a retrospective study we have a small sample and this is single rural centre scenario so difficult to have generalised implementation it would be more appropriate to have a multicentre data and comparison to urban centre data.

Conclusions

In our rural centre, most of admissions were elective surgeries; among them gastrointestinal conditions, congenital anomalies were most common admission pattern. Among emergency

admissions appendicitis and non-specific abdominal pain were most common admission pattern requiring super speciality services.

Recommendations

- Each tertiary referral hospitals should have super speciality services which are lacking even in our urban centres
- Training, education and telemedicine services should be made sound so that more and more children can be tackled before referral to a super speciality centre
- Rural and community services should be linked to regional tertiary care centre so that seamless transfer of care can be done at the earliest when needed
- Audit of paediatric surgical cases managed locally and referred to tertiary centre can help to locate the areas where coordination is required
- Proper primary stabilisation and diagnosis before transfer can have better surgical outcomes when they arrive at tertiary referral centre
- Establishing standards and integrating them into national surgical plans
- Capacity building at tertiary care hospitals and providing infrastructure and facilities at tertiary care hospitals
- Special incentives, cadre or packages are needed to attract superspecialist to government hospitals.

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Conflicts of interest

There are no conflicts of interest.

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