Aim: Common pediatric surgical entities often get a delayed referral to the pediatric surgeon in the average Indian scenario. This study was conducted to assess the awareness about management of select common pediatric surgical entities among practicing pediatricians.

Materials and Methods: An online multiple-choice questionnaire consisting of twenty questions related to the diagnosis and management of common pediatric surgical entities encountered by pediatricians in their routine office practice was prepared, and the electronic link was circulated among the practicing pediatricians of India. Each question had one correct response.

Results: One hundred and seventy-five responses were obtained, collated, grouped, and analyzed. Overall, 35% of all responses were correct. Individually, 56% of respondents marked 51%–75% of answers correctly; only 7% scored above 75%. Some clinical observations were disparate: 65% were unfamiliar with preputial adhesions and 51% would discharge a preterm neonate with inguinal hernia without a surgical consult. There is a tendency toward unnecessary imaging (60% – localization of undescended testis, 91% – wet umbilicus, and 51% – postanal dimple) and overzealous medical management (propranolol for the involuting hemangioma). However, 82%–88% concurred on the standard conservative or surgical management in index conditions such as hypospadias and umbilical problems.

Conclusion: There was a concurrence in the principles of management of common pediatric surgical entities between pediatricians and pediatric surgeons in 35%. Misdiagnosis, unwarranted investigations, overzealous medical management, and delayed surgical consults figured in 65%. A systematic professional interaction between the physicians and surgeons would facilitate a coordinated management. A larger study would yield more meaningful data.

Keywords: Awareness, children, common, Indian pediatrician, pediatric surgery

INTRODUCTION

Children requiring surgical care are best served by the skills of a pediatric surgical specialist or subspecialist. “Pediatric surgery” was recognized as a specialized discipline in India five decades ago when the first training center was started at Chennai in 1966 under Dr. M. S. Ramakrishnan.[1] A key element of comprehensive care for children involves the coordination of services between pediatrician and pediatric surgeons. Yet, in routine clinical practice, it is noticed that common pediatric surgical entities (hernia, hydrocele, testicular torsion, undescended testis - UDT, phimosis, hypospadias, etc.) often get a delayed referral to the pediatric surgeon. Although figures vary across health sectors, these constitute about 10% of a general

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Mahalik SK, Pati AB, Das K. Awareness of common pediatric surgical entities among practicing Indian pediatricians. J Indian Assoc Pediatr Surg 2021;26:89-93.
pediatric practice and contribute to up to 25% of a general pediatric surgical operating list. Although a poorly informed caretaker (parents/guardian) is usually responsible for the delay, it is often due to an error in the assessment and referral by the primary pediatrician at the first contact of the child with the health services.

Thus, the current study was conducted to assess the awareness and knowledge about the diagnosis and management of some common pediatric surgical entities among practicing pediatricians.

**Materials and Methods**

An online, multiple-choice questionnaire with a set of twenty questions related to the diagnosis and management of common pediatric surgical entities encountered by pediatricians in their routine office practice was prepared. Each question had one clear, correct response. The link (https://goo.gl/forms/EbJatjUXuGubG6EM2) was circulated among the practicing pediatricians of India through WhatsApp application, Telegram application, and personal E-mails, between May 2018 and July 2018. The responses were collated and analyzed in percentages.

**Results**

There were 175 responses from 16 states and one Union Territory. The maximum responses were from Odisha (65), followed by Karnataka (29), Punjab (26), and Maharashtra (11). Overall, 35% of all responses from all respondents were correct. While Figure 1 shows the percentage of correct responses and the corresponding number of respondents (pediatricians), Figure 2 displays the percentage of respondents who answered correctly in the specific domains. Further details about the responses are grouped below for ease of presentation.

**Preputial adhesions and labial synechiae**

Sixty-five percent of the respondents were not familiar with the physiologic nature of childhood preputial adhesions/physiological phimosis. Twenty percent advocated empiric antibiotics, investigations for suspect urinary tract infection, immediate preputial retractions, or circumcision. Similarly, labial synechiae were confused with the rare, ominous vaginal atresia in 20%.

**Inguinal hernia and hydrocele**

Fifty-one percent would discharge a preterm baby with inguinal hernia from the neonatal services without a surgical consult or a herniotomy. For a neonatal-infantile hydrocele, 24% would order an ultrasonography (USG) to clinch their clinical diagnosis and 13% would refer for an immediate surgery.

**Undescended testis, retractile testis, and torsion testis**

In unilateral UDT of infancy, 60% will order an imaging for localization; the modality chosen was USG (55%), or either magnetic resonance imaging (MRI) / contrast-enhanced computed tomography scan (19%). Only 26% ticked diagnostic laparoscopy as the choice in impalpable UDT. While 24% chose to wait beyond 1 year for orchidopexy, 11% would operate even before 6 months. In a retractile testis of early childhood, 50% would observe, 44% would consider orchiopexy, and 6% use human chorionic gonadotropin to facilitate descent. In an emergency scenario of torsion testis, majority (65%) will refer for immediate surgery, yet 29% will advise an USG Doppler even in late presenters.

![Figure 1: Percentage of correct responses and the corresponding number of respondents (pediatricians)](image-url)
Hypospadias
Regarding the ideal age for surgical management of hypospadias, 88% agreed that it should be operated by 2 years of age. In a scenario of penoscrotal hypospadias with bilateral UDT, 45% preferred referral to a pediatric surgeon, whereas another 42% chose to initiate investigations for disorders of sexual differentiation in a haphazard manner.

Umbilical complaints
Majority (83%) agreed for an expectant management of umbilical hernia. In dealing with umbilical granuloma, 91% of respondents opted for an outright investigation of a wet umbilicus for persistent vitellointestinal duct or patent urachus, whereas 55% opted for chemical cauterization.

Miscellaneous entities
Fifty-one percent would like to investigate the innocuous postanal dimple in a neonate with various modalities – MRI (28%), USG (13%), or sinogram (10%). In small involuting hemangiomas, 64% will simply observe and follow-up, whereas 31% will advocate propranolol therapy. The majority (82%) concur on the importance of a dietary review and modification in managing functional constipation. In painful defecation with suspect anal fissuring, 70% would persist with a per rectal examination. Most pediatricians opted for counselling (87%) and reassurance in nocturnal bed wetting in a young male. Similarly, 84% will reassure and advise observation / follow-up in a peripubertal boy with unilateral gynecomastia. Furthermore, 86% of the respondents could identify a normal buried phallus in an obese boy presenting with a “small phallus.”

Discussion
Pediatric surgery is an established superspecialty branch in India with an increasing presence for last five decades. However, as in several developing countries, pediatricians are the primary care providers or the first specialist to come in contact with a child with a surgical problem. A correct diagnosis and timely referral are the key for optimal outcome, and the practicing pediatricians must be aware of the common pediatric surgical conditions and their basic current management to facilitate appropriate investigations, timely referral, and surgery.

The survey throws light on the perspectives of practicing pediatricians on some common pediatric surgical conditions. The questionnaire assessed specific core management principles of the entities and responses tallied with the prescribed standard in textbooks and guidelines. Overall, there was a concurrence with respect to the principles of management of common pediatric surgical entities between the pediatricians and prescribed pediatric surgical practice in 35%. When the percentages of individual correct responses were analyzed [Figure 1], 37% scored below 50%, 56% between 51% and 75%, and only 7% above 75%. The disparity between perspectives of the respondents and standard prescribed practice varied across the different domains [Figure 2]; these are discussed below.

Preputial and labial adhesions
Two-thirds of respondents did not recognize the physiologic nature of preputial adhesions and its conservative management.

Figure 2: Percentage of respondents who answered correctly in the specific domains
during bathing and urination makes foreskin retractile over time. Topical steroid application may aid the process, an occasional one that fails will need a circumcision.\[^2\] The senior author had documented such a concern on misdiagnosis and unwarranted circumcisions several years earlier.\[^3\] The tendency to investigate these for UTI in the presence of a local cause continues. The female counterpart, i.e. labial synchiae, was better appreciated and fewer (20%) would investigate for major genital anomalies.

**Inguinal hernia and hydrocele**

The controversy in the optimal timing for repair of neonatal inguinal hernias vacillates between higher rate of reoperation (8.1%) in an early repair and incarceration (9.5%) with a delay.\[^4,5\] The optimal timing is a balance between the complications against the anesthetic risks.\[^6\] Delaying hernia repair in a premature infant in the neonatal intensive care unit to just before discharge allows for repair closer to term (gestational age >47 weeks) with minimal risks.\[^5^-^7\] Half the respondents opted for the dangerous option of discharging the neonate with hernia before a repair. Unlike hernia, surgery is avoided in congenital/infantile hydroceles till 2 years of age as most resolve naturally. Similarly, hydrocele is a diagnosis of clinical examination that hardly mandates radiological investigations.\[^7\]

**Undescended testis, retractile testis and torsion testis**

Most were not conversant with the guidelines in the management of UDT. Orchiopexy is recommended soon after 6 months of age (corrected to term) to maximize the future fertility potential.\[^8\] The problem seems widespread; a report of 250 patients with UDT from Leicester, UK (mean age at referral: ~57 months, 24% underwent orchiopexy before 2 years of age) cites delayed referral as a major contributing factor.\[^9\] The use of imaging studies for accurate preoperative localization of UDT is a widely prevalent and wasteful practice. Careful physical examination of the patient obviates the need for imaging studies in clinically palpable UDT. A recent meta-analysis demonstrates the low efficacy of USG in boys with nonpalpable UDT.\[^10\] The current European Society for Pediatric Urology guidelines state that USG, CT, and MRI do not provide additional information than that obtained by physical examination.\[^11\] Examination under anesthesia can make about 18% of the nonpalpable UDT to be palpable; the truly impalpable ones are then subjected to a diagnostic laparoscopy with an accuracy of localization up to 100%.\[^11\]

Testicular torsion is a surgical emergency requiring prompt surgical exploration and management. Testicular salvage rates are closely linked to the duration of ischemia with a ‘golden’ window of 4–8 h from the time of torsion to detorsion.\[^12\] The diagnosis is made by history and physical examination. Although an immediate imaging (Doppler ultrasound and isotope scan) confirms the diagnosis, surgical management should not be delayed in anticipation of these investigations. Furthermore, in unilateral testicular torsion, contralateral orchiopexy is routinely offered to eliminate the risk of torsion of the lone gonad in the future.\[^12\]

**Hypospadias and disorder of sexual differentiation**

Most were aware of the shift in the age of surgery in hypospadias to the 2nd year of life. Clinical features that compel a practitioner to suspect a disorder of sexual differentiation include the following - clitoromegaly, inguinal / labial mass or posterior labial fusion in the apparent female; and micropenis with bilateral nonpalpable testes, hypospadias with undescended testes and isolated penoscrotal, / perineoscrotal hypospadias in the apparent male. A well-planned, multidisciplinary management is essential in evaluating these patients before the calendar of management is charted out. Nearly half chose to investigate such cases themselves, reflecting a general lack of referral to a specialized team for uncommon entities.

**Umbilical issues**

The conservative management of umbilical hernias was evident but most were aggressive in investigating a wet umbilicus, without a customary trial of observation or cautery with various materials. The fact that such an approach tends to over investigate an otherwise self-limiting condition is obvious.

**Miscellaneous entities**

Several conditions that are innocuous and mandate judicious observation and targeted investigation in select cases were presented. While some responses were aligned to the recommended wait/watch policy, many opted for premature blanket investigations. Infantile hemangiomas are common benign vascular tumors and most cutaneous ones are isolated, superficial, and in nontreating locations. Yet, instead of reassurance about the natural course, treatment options, and anticipatory guidance,\[^13\] a third would start propranolol. Likewise, half would investigate an isolated postanal dimple that does not merit further investigation with an MRI.\[^14\] However, <20% singled out habitual constipation, nocturnal enuresis, buried phallus, or pubertal gynecomastia for a slew of unnecessary investigation.

In the current survey, there was a concurrence in the awareness about the management between the pediatricians and pediatric surgeons with respect to several entities in a third of instances discussed – vaginal
synechiae, timing of hypospadias surgery, umbilical hernia, and management of functional constipation, nocturnal bed-wetting, peripubertal gynecomastia, and buried penis in an obese child. However, there was a deviation from the accepted principles of management in the rest. While half of the respondents scored 50%–75%, a miniscule (7%) showed adherence to the standard management scoring >75%. These figures suggest the need for a closer interaction and exchange of information between the physicians and surgeons caring for children in the country. The limitations of this study are the following – it did not analyze the nature of practice (institutional/corporate/private) or clientele of the respondents, it was limited to a few select entities that were deemed common in general practice, and the number of survey participants was modest compared to the large number of pediatricians contacted across the country. Each of these allows for a skew and a bias in the overall interpretation. According to the Indian Association of Pediatrics (IAP) website, in 2013, there were more than 23,000 pediatricians in India. Hence, a broader participation would yield more a meaningful and representative picture of the current scenario.

**Conclusion**

There was a concurrence in the principles of management of common pediatric surgical entities between pediatricians and pediatric surgeons in 35%. Misdiagnosis, unwarranted investigations, overzealous medical management, and delayed surgical consults figure prominently in the rest 65%. A recent survey by the authors (unpublished observations) on interactions between pediatric surgeons and postgraduates of pediatrics/practicing pediatricians revealed the following: only 20% of the postgraduates (MD/DNB pediatrics) had a clinical exposure to the specialty during training; similarly, 20%–65% of pediatric surgeons agreed to an optimal referral pattern from their medical colleagues. There is clearly a need for systematic professional interaction between the physicians and surgeons caring for the sick child to facilitate a coordinated management. A multipronged educational strategy involving medical curricula (undergraduate, postgraduate, and postdoctoral), professional associations (e.g., National Neonatology Forum, Indian Academy of Pediatrics, and Indian Association of Pediatric Surgeons), social networking sites, print media and television is required to bridge the gap. Well-designed surveys focusing on common neonatal and pediatric surgical entities with the active participation of practicing pediatricians will help in evaluating prevalent practice, identifying the gaps and formulating strategies for continuing education. It is hoped that a coordinated approach will diminish the frequency of delayed surgical referral and unwarranted investigations, thereby facilitating optimal surgical management.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. Shah R. The past, the present, and the future of pediatric surgery in India. J Indian Assoc Pediatr Surg 2015;20:2-7.
2. Shahid SK. Phimosis in children. ISRN Urol 2012;2012:707329.
3. Kumar P, Deb M, Das K. Preputial adhesions-A misunderstood entity. Indian J Pediatr 2009;76:829-32.
4. Duggan EM, Patel VP, Blakely ML. Inguinal hernia repair in premature infants: More questions than answers. Arch Dis Child Fetal Neonatal Ed 2015;100:F286-8.
5. Sulkowski JP, Cooper JN, Duggan EM, Balci O, Anandalwar SP, Blakely ML, et al. Does timing of neonatal inguinal hernia repair affect outcomes? J Pediatr Surg 2015;50:171-6.
6. Crankson SJ, Al Tawil K, Al Namshan M, Al Jadaan S, Baylon BJ, Gieballa M, et al. Management of inguinal hernia in premature infants: 10-year experience. J Indian Assoc Pediatr Surg 2015;20:21-4.
7. Mohta A. Optimal timing for pediatric surgical procedures. Indian Pediatr 2002;39:648-53.
8. Murphy F, Paran TS, Puri P. Orchiopexy and its impact on fertility. Paediatr Surg Int 2007;23;625-32.
9. Sinha CK, Vinay S, Kulkarni R, Nour S. Delayed diagnosis for undescended testes. Indian Pediatr 2008;45:503-4.
10. Tasian GE, Copp HL. Diagnostic performance of ultrasound in nonpalpable cryptorchidism: A systematic review and meta-analysis. Pediatrics 2011;127:119-28.
11. Pradhan MR, Ansari MS. Imaging studies for non-palpable testis: Are they at all required? Indian J Urol 2012;28:227-9.
12. Bowlin PR, Gatti JM, Murphy JP. Pediatric Testicular Torsion. Surg Clin North Am 2017;97:161-72.
13. Sethuraman G, Yenamandra VK, Gupta V. Management of infantile hemangiomas: Current trends. J Cutan Aesthet Surg 2014;7:75-85.
14. Lee ACW, Kwong NS, Wong YC. Management of sacral dimples detected on routine newborn examination: A case series and review. HK J Paediatr new series 2007;12:93-5.