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EAU Guidelines – Editor's choice

European Association of Urology-European Society of Paediatric Urology Guidelines on Paediatric Urology: Summary of 2024 Updates. Part II

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Abstract

Background and objective: We present a summary of part II of the 2024 update of the European Association of Urology (EAU)/European Society of Paediatric Urology (ESPU) guidelines on paediatric urology. The summary provides evidence-based standards for management of a number of urological conditions in the paediatric population. The aim is to provide practical recommendations for clinical management of these conditions with a focus on diagnosis, treatment, and follow-up.
Methods: For the guidelines update, new and relevant evidence was identified, collated, and appraised via a structured assessment of the literature. Databases searched included Medline, EMBASE, and the Cochrane Libraries. Recommendations in the guidelines were developed by the panel to prioritise clinically important care decisions. The strength of each recommendation was determined according to a balance between desirable and undesirable consequences of alternative management strategies, the quality of the evidence (including the certainty of estimates), and the nature and variability of patient values and preferences.
Key findings and limitations: Key recommendations emphasise the importance of thorough diagnosis, treatment, and follow-up for patients with the conditions outlines.

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Urachal remnants
Transitional urology

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The guidelines stress the importance of a multidisciplinary approach to treatment and the importance of shared decision-making with patients and their guardians/caregivers. The summary provides evidence-based standards for management of undescended testes, testicular tumours in prepubertal boys, acute scrotum, hypospadias, congenital penile curvature, urinary tract infections, daytime lower urinary tract conditions, urachal remnants, and transitional urology.

Conclusions and clinical implications: Part II of the 2024 EAU/ESPU guidelines provides updated guidance for evidence-based management of a number of paediatric urological conditions, with recommendations designed for effective integration into clinical practice.

1. Introduction

The aim of the European Association of Urology (EAU)/European Society of Paediatric Urology (ESPU) guidelines on paediatric urology is to offer evidence-based standards for the management of urological conditions in children. It must be emphasised that clinical guidelines present the best evidence available to experts, but following guideline recommendations will not necessarily result in the best outcome. Guidelines can never replace clinical expertise when making treatment decisions for individual patients, but rather help to focus decisions that also take the personal values and preferences and individual circumstances of patients into account. Guidelines are not mandates and do not purport to be a legal standard of care.

The EAU/ESPU guidelines, unlike other guidelines, include all paediatric urology conditions. Therefore, given the volume of material, the summary of 2024 updates to the guidelines is presented in two parts. This summary, Part II, addresses management of undescended testes (UDT); testicular tumours in prepubertal boys; acute scrotum; hypospadias; congenital penile curvature (CPC); urinary tract infection (UTI); daytime lower urinary tract (LUT) conditions; rare conditions in childhood; and transitional urology. The subsection on transitional urology is new, and a subsection on rare conditions in childhood focuses on urachal remnants (URs). Updated guidance for other paediatric urological conditions has already been published [1].

2. Methods

For the guidelines, new and relevant evidence was identified, collated, and appraised via a structured assessment of the literature. A broad and comprehensive scoping exercise covering the topics presented was performed. The detailed search strategy is available online (https://uroweb.org/guidelines/paediatric-urology/publications-appendices).

Recommendations in the guidelines were developed by the panel to prioritise clinically important care decisions. The strength of each recommendation is determined by the balance between desirable and undesirable consequences of alternative management strategies, the quality of the evidence (including certainty of estimates), and the nature and variability of patient values and preferences. Strong recommendations typically indicate a high degree of evidence quality and/or a favourable balance of benefit to harm and patient preference. Weak recommendations typically indicate that only lower-quality evidence was available [2].

3. Guidelines

3.1. Management of UDT

UDT incidence varies and depends on gestational age, affecting 1.0–4.6% of full-term and 1.1–45% of preterm neonates. UDT is associated with higher risk of impaired fertility and testicular cancer, not limited to congenital cases. Structural abnormalities are often found in the affected testicles, which are typically smaller in size [3]. The most useful classification of UDT is distinguishing palpable versus nonpalpable testes, and clinical management is decided by the location and presence of the testes.

A medical history and a physical examination are key in evaluating boys with UDT. Localisation studies using different imaging modalities usually provide no additional benefit.

Treatment should be started at the age of 6 mo, since UDTs rarely descend after that age [4]. Any treatment leading to a scrotally positioned testis should be completed by the age of 12 mo, or 18 mo at the latest, because histological examination of UDT at that age has already revealed progressive loss of germ cells and Leydig cells [5].

Hormone treatment appears to have no benefit with regard to testicular descent [3]. However, hormonal treatment might improve fertility indices [6,7] and therefore may serve as an additional tool to orchidopexy.

Surgery for palpable testes includes orchidofunicolysis and orchidopexy, via either an inguinal or a scrotal approach. For nonpalpable testes, surgery must clearly determine whether a testis is present or not [8]. An important step in surgery is a thorough re-examination once the boy is under general anaesthesia, as a previously nonpalpable testis might be identifiable, which changes the surgical approach. The optimal approach for locating an intra-abdominal testis is diagnostic laparoscopy [9]. During laparoscopy for nonpalpable testes, possible anatomic findings include spermatic vessels entering the inguinal canal (40%), an intra-abdominal (40%) or peeping (10%) testis, or

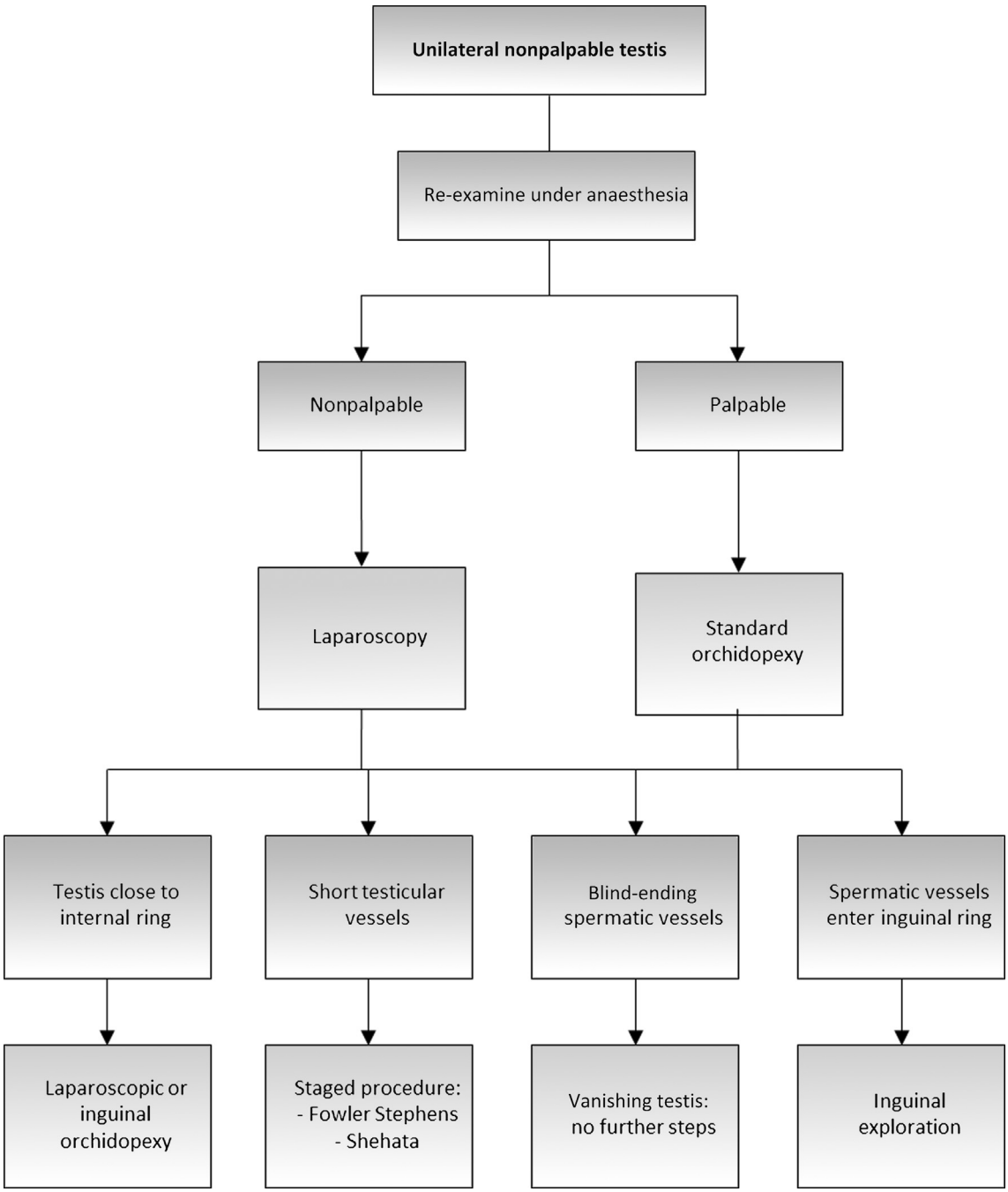

Fig. 1 – Treatment for a unilateral nonpalpable undescended testis.

blind-ending spermatic vessels confirming vanishing testis (10%) [10] (Fig. 1). Subsequent removal or orchidopexy can be carried out laparoscopically [11]. If a staged procedure is required, the most common techniques described in the literature are the Fowler-Stephens procedure and the Shehata technique for intra-abdominal testes [12]. Laparoscopic orchidopexy for intra-abdominal testes is associated with a slightly higher rates of atrophy and retraction in comparison to the conventional inguinal approach, especially if a staged approach is required [3].

The association of UDT with compromised fertility [13] is extensively discussed in the literature and seems to be a result of multiple factors, including germ cell loss, impaired germ cell maturation [14], Leydig cell diminution, and testicular fibrosis [15].

3.2. *Tumours in prepubertal boys*

In prepubertal boys, testicular tumours differ significantly from those in adolescent and adult men: the incidence is lower (0.5 to 2 per 100 000 children, peak incidence between the ages of 0 and 4 yr) and the tumours are mostly benign and can generally be classified as germ cell tumours or stromal tumours [16–21]. Clinical presentation is a painless scrotal mass in more than 90% of patients. To confirm the diagnosis, a high-resolution Doppler ultrasound examination (7.5–

12.5 MHz) is required, with a detection rate of almost 100% [22–26]. However, differentiation between benign and malign tumours via ultrasound alone can be difficult. Testicular microlithiasis is increasingly seen in prepubertal boys, especially in patients who have undergone orchidopexy [27]. In patients with contributing risk factors, routine monthly self-examination of the testes is recommended from puberty onwards [28]. When tumour markers are used, the age of the patient should be taken into account, as α-fetoprotein (produced by >90% of yolk sac tumours) has a clear limitation in sensitivity and specificity in the first months of life [29]. β-hCG is not useful in prepubertal boys. In patients with a malignant tumour, staging should be performed via either a computed tomography (CT) scan or magnetic resonance imaging of the abdomen, and a CT scan of the chest. If there is any suspicion of a non–organ-confined tumour, the patient should be referred to a paediatric oncologist. If a testicular tumour is suspected, testis-sparing surgery, with the option of intraoperative frozen section, should be performed whenever possible. A systematic review revealed that the recurrence rate after surgery was 5.8% (95% confidence interval 2.3–14.1%) in cohorts in which 70.9% of patients had a benign finding [30]. For surgery, the panel recommends an inguinal approach. Regular follow-up examination beyond the first year after surgery seems reasonable only for patients with a malignant tumour.

3.3. *Acute scrotum*

Acute scrotum is a paediatric urological emergency, most commonly caused by torsion of the testis (TT), appendix testis, or epididymitis/epididymo-orchitis [31–36]. Patients usually present with scrotal pain, except in neonatal torsion. The sudden onset of severe pain in combination with a vagal reaction (eg, nausea, vomiting) is typical for TT or appendix testis [37,38]. As the probability of irreversible changes and subsequent necrosis in TT is time-dependent, with a critical window of approximately 4–6 h, prompt diagnosis is essential [39].

Surgical exploration is necessary in the TT setting. If TT is confirmed, contralateral orchidopexy is commonly performed as well [40]. Epididymitis is usually self-limiting and heals with supportive therapy (minimal physical activity and analgesics) without any sequelae.

3.4. *Hypospadias*

The prevalence of hypospadias varies internationally [41,42]. Risk factors include genetic, placental, and environmental influences [43–47]. Family history increases the risk, particularly for anterior and middle forms [48,49]. Classification is based on the location of the urethral orifice (distal-anterior, intermediate-middle, or proximal-posterior) [50], but severity may also depend on penile length, curvature, glans size, and urethral plate quality. Reclassification may therefore occur during surgery [51].

Typically diagnosed at birth, hypospadias comprises a proximal meatal orifice, hooded foreskin, and varying degrees of penile curvature. If hypospadias occurs with bilateral UDT, a complete genetic and endocrine workup to exclude differences of sex development is warranted [52].

The aim of surgical management is to achieve normal penile function and appearance by addressing issues related to the proximal meatus, meatal stenosis, ventral curvature, and preputial deformity. Preoperative counselling of the caregiver is crucial. Evidence for the use of preoperative hormone therapy is equivocal. Hormonal treatment is usually limited to patients with proximal hypospadias with a small glans diameter [53–58]. For primary hypospadias, age at surgical repair is usually 6–18 mo [59–61]. Penile curvature in hypospadias is common and correlates with the severity of the anomaly. Curvature >30° typically warrants correction [62]. Correction involves degloving, excision of ventral connective tissue, and addressing urethral plate tethering [63–65]. In severe hypospadias, urethral plate mobilisation without transection is not recommended owing to the high risk of ventral curvature recurrence (20%) and stricture formation (17%) [62]. Techniques include dorsoplication with or without excision of the tunica albuginea, and ventral lengthening via various corporotomy techniques, with or without grafting. In cases of severe curvature, ventral lengthening may be superior to dorsoplication, as the incidence of curvature recurrence is less frequent (5% vs 25%) [66,67]. A tubularised incised plate (TIP) procedure for proximal hypospadias is associated with a high rate of recurrence of ventral curvature (26%) [62].

Various surgical techniques for the management of hypospadias are shown in Fig. 2 [64,68–78]. Staged procedures are increasingly preferred owing to a lower recurrence rate for ventral curvature and better outcomes, although long-term complication rates vary [68,79–86]. It has been shown that second-layer coverage of the neourethra minimises the incidence of fistula [87–89]. Preputial reconstruction can be considered if foreskin is not required for reconstruction, for which there is no change in the risk of urethral complications [90] and moderate risk of preputial dehiscence (7–17%) and secondary phimosis (1.5%) [90–92]. The type of stent material or dressing does not impact surgical outcomes [93,94]. There is no consensus on the optimal duration for the stent and dressing [94–97]. Prophylactic antibiotics in distal hypospadias repair do not reduce rates of postoperative surgical site infection or UTI [98–100]. Outcomes of primary repair are successful in 85–90% of distal and 32–86% of proximal hypospadias cases [81,101–104]. Complications are seen in 23.3% of repeat repairs and 12.2% of primary repairs [104]. Overall, fistula rates after hypospadias repair range from 5% to 50% [101,104]. Meatal stenosis occurs in 5–15% of cases. The use of inlay grafts reduces the risk of meatal stenosis by 66% [105]. Urethral strictures (8–13%) often affect proximal repairs, even with staged procedures [87]. TIP should only be performed in cases with curvature of <30° to minimise complications [62,82,106]. Glans dehiscence (9–17%) is linked to smaller glans (<14 mm) and proximal hypospadias, but rarely impacts long-term function despite aesthetic concerns [104,107].

Long-term follow up after hypospadias repair is essential, as significant rates of late complications have been reported [108,109]. A recent study showed a total reoperation rate of 48% in the first 15 yr of life for proximal hypospadias [90]. Obstructive urinary flow curves are com-

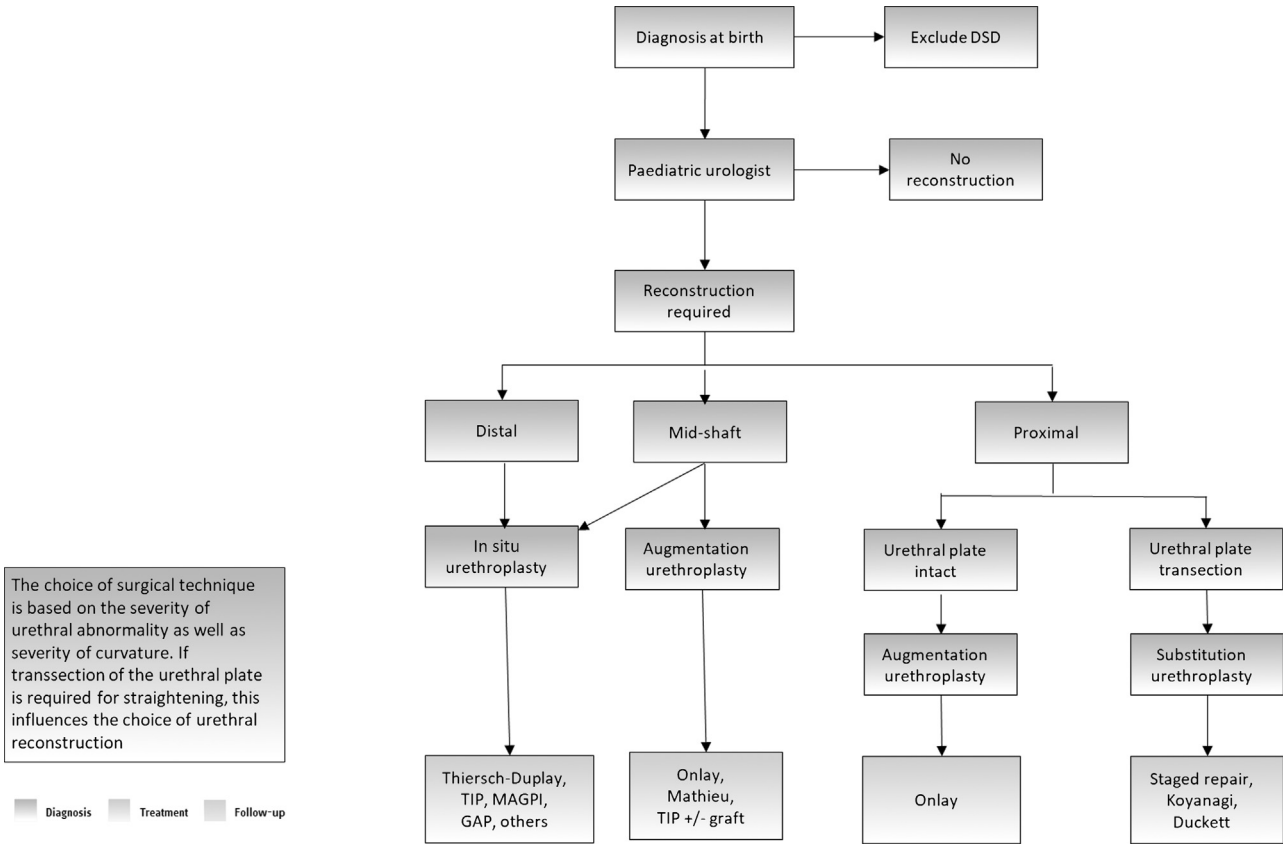

Fig. 2 – Algorithm for the surgical management of hypospadias. DSD = differences of sex development; TIP = tubularised incised plate urethroplasty; MAGPI = meatal advancement and glanuloplasty incorporated; GAP = glandular approximation procedure; Mathieu = foreskin onlay flap; Snodgraft = preputial inlay graft; Duckett = preputial hood onlay flap.

mon [110–112]. Satisfaction with penile appearance varies, with caregivers less satisfied than patients [113–117]. Most report good sexual function, although severe cases may impact psychosexual wellbeing and paternity because of persistent curvature or lower semen quality [118,119]. Studies on outcomes are marred by high follow-up loss and lack of standard health-related quality of life (QoL) tools specific to hypospadias [120].

3.5. *Congenital penile curvature*

CPC is curvature of the penis with a normally positioned meatus, commonly manifesting as ventral deviation (48%), followed by lateral (24%), dorsal (5%), and a combination of ventral and lateral (23%) deviation [67,121]. While CPC has an incidence rate of 0.6–5% at birth [67], only a small proportion of cases present with significant curvature. Curvature >30° is often considered clinically relevant, but many patients with this degree of curvature report no functional issues [62]. The condition can impact sexual QoL in adults, and corrective surgery often improves both psychosocial and sexual wellbeing [122]. Diagnosis usually occurs in later childhood or adolescence when the penis becomes visibly abnormal on erection. Documentation, including photographic records [123], aids in preoperative assessment, especially for patients who express functional or aesthetic concerns [124].

Management primarily involves conservative observation during childhood. Surgery is generally postponed until the individual can make an informed choice, as functional discomfort rather than curvature degree typically dictates intervention [125]. Surgical correction seeks to achieve corpora of similar size. The degree of curvature is determined at the time of surgery using an artificial erection test. The use of measurement tools aids in the accuracy of curvature assessment [126]. Techniques include degloving of the penile skin, followed by excision of any abnormal subcutaneous connective tissue if present. Correction of corpora disproportion may include wedge-excision and closure of the tunica albuginea (Nesbitt procedure), plication without excision, and a longitudinal incision with transverse closure (Heineke-Mikulicz principle). For more severe cases, ventral lengthening procedures via urethral transection, corporotomy, or corporoplasty with grafting may be necessary.

Success rates for CPC correction are high (90–100%) [67,127,128], with substantial patient satisfaction even if minor residual curvature remains [129].

3.6. *Urinary tract infections*

UTIs are the most common bacterial infections in children [130]. The primary causative organism is *Escherichia coli*, although other bacteria are increasingly being recognised, along with a rising prevalence of multidrug-resistant *E. coli* infections [131]. UTIs can be classified in various

ways, including upper versus lower UTI, febrile versus afebrile UTI, first versus recurrent/breakthrough episodes, and typical versus atypical presentations.

Urine samples for diagnostic analysis can be collected via several methods, including a urine bag, clean catch, catheterisation, and suprapubic aspiration. Each collection method has distinct advantages and limitations. Methods for urinalysis include dipstick testing, microscopy, and imaging analysis technology for flow. A positive urine culture is recommended before proceeding with urinalysis [132]. Regarding additional investigations, the panel recommends renal and bladder ultrasound following a febrile UTI. Additional investigations should be considered on the basis of the patient's characteristics and specific features of the infection. A proposed flowchart is provided for guidance in Fig. 3.

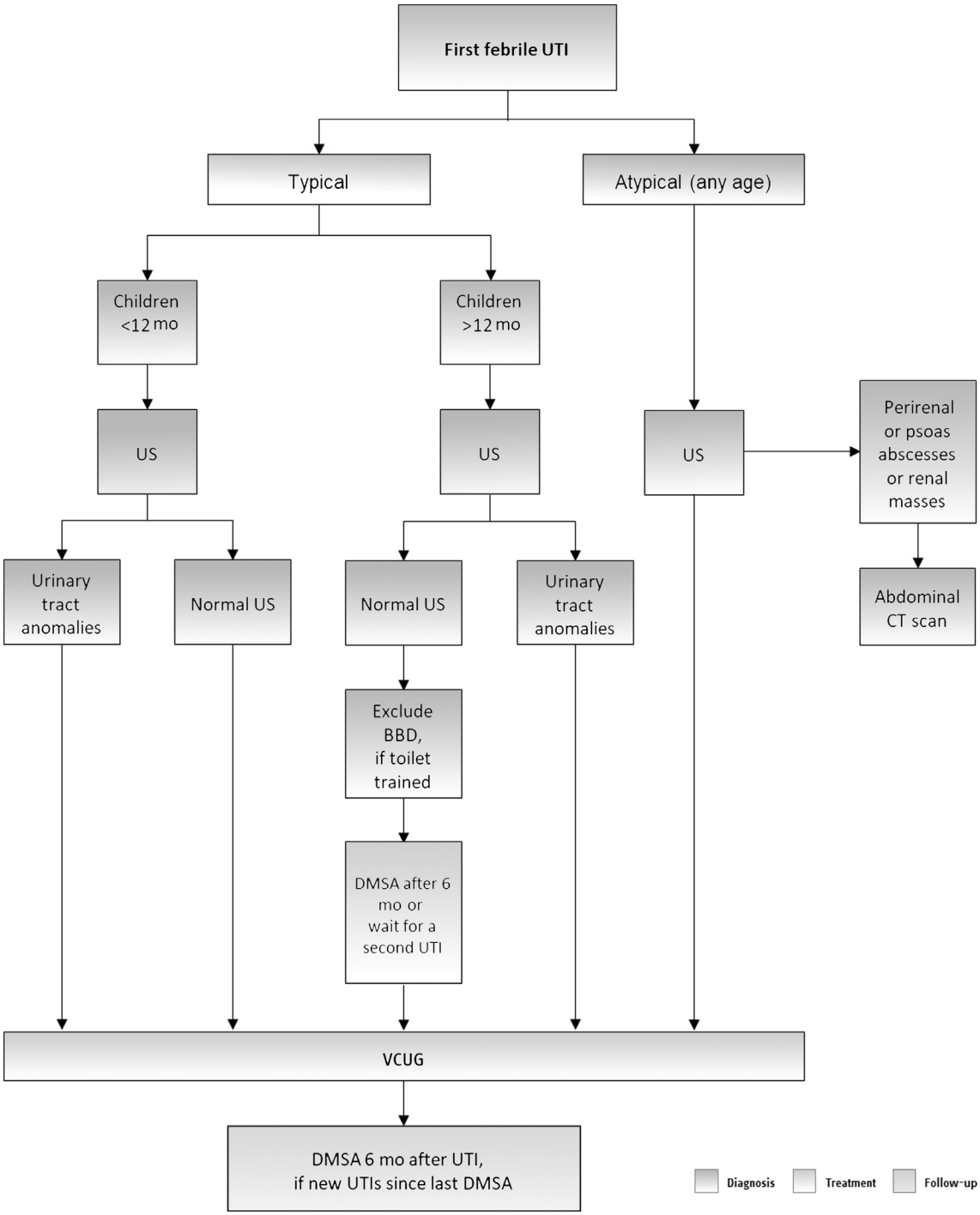

Fig. 3 – Diagnosis strategy for first febrile urinary tract infection (UTI). BBD = bladder and bowel dysfunction; CT = computed tomography; DMSA = dimercaptosuccinic acid scan; US = ultrasound; VCUG = voiding cystourethrogram.

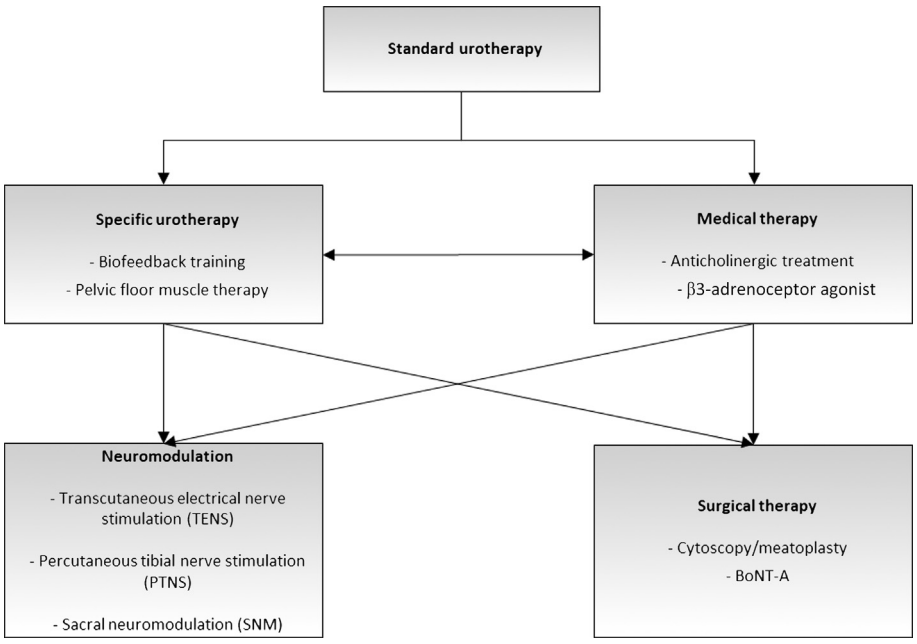

Fig. 4 – Treatment of daytime lower urinary tract (LUT) conditions. BoNT-A = botulinum toxin A.

The cornerstone of UTI management is prompt antimicrobial therapy [133]. The route of administration should be chosen on the basis of factors such as the patient's age and clinical condition. The choice of antimicrobial agent should be guided by local sensitivity patterns and adjusted as necessary following susceptibility testing [134]. Interventions to prevent UTI recurrence may include chemoprophylaxis, non-antibiotic prophylaxis, and addressing contributing factors such as phimosis, bladder-bowel dysfunction, and LUT dysfunction. Providing practical guidance on the management and diagnostic evaluation of UTIs in children remains challenging because of limited literature and a generally low level of evidence.

3.7. *Daytime LUT conditions*

The term "daytime LUT condition" is used to group together all functional bladder problems in children, for which prevalence ranges from 2% to 25% [135–139]. Various factors have been associated with daytime LUT conditions, such as obesity, UTI history, nocturnal enuresis, a family history of LUT conditions, age of potty training, neuropsychiatric developmental disorders, and bowel symptoms [140–145]. When evaluating a child, a comprehensive medical history should be taken. A voiding diary should also be completed for a minimum of 2 d, including micturition frequency, voided volumes, nighttime urine output, number and timing of incontinence episodes, and fluid intake. Use of ultrasound to measure the rectal diameter predicts the presence of constipation and correlates well with bladder-bowel dysfunction [146,147]. Urinalysis and urinary culture are essential to evaluate for a UTI. Uroflowmetry with measurement of postvoid residual volume evaluates the voiding and emptying ability of the bladder, with or without pelvic floor electromyography. Sometimes, there are underlying neurological problems, which can be diagnosed using (video)-urodynamic studies or neurological evaluation.

Treatment of daytime LUT conditions involves a multimodal approach, which is summarised in Fig. 4. Behavioural modification, mostly referred to as urotherapy, is a term that covers all nonpharmacological and nonsurgical treatment modalities. For children with a therapy-refractory LUT condition, specific interventions can be added, including biofeedback, physiotherapy (eg, pelvic floor exercises), alarm therapy, and specialised training programmes [148–152]. Anticholinergic agents are still the mainstay of medical treatment, and oxybutynin is most commonly used [153]. Evidence supporting the effectiveness and safety of mirabegron has been confirmed in several studies, but it is still off-label for this indication in children [154–158]. Neuromodulation, including (parasacral) transcutaneous electrical nerve stimulation, posterior tibial nerve stimulation, and sacral neuromodulation, can be considered as a second-line treatment after urotherapy and medical therapy have failed [159–167]. Cystoscopy should be performed when there is suspicion of LUT obstruction. Intravesical botulinum toxin A can be considered as a second-line treatment, even though it is still used off-label [168]. Symptoms of incontinence have a negative impact on QoL of patients and their caregivers [169]. Furthermore, children treated for LUT conditions are more likely to have urinary tract symptoms later in life, so adequate transition to adult urology clinics is important when needed [170–172].

3.8. *Rare conditions in children: URs*

URs originate from failure of allantois obliteration, resulting in a urachal sinus, urachal cyst, vesicourachal diverticulum, or patent urachus [173–175]. According to reports, the prevalence of URs is highly variable, possibly because of the use of different definitions. In most cases, UR is asymp-

tomatic. The most common UR symptom is umbilical granulation, (urinary) discharge, and erythema in infants, and abdominal pain or recurrent UTI in older children [176]. When UR is suspected, a careful history and physical examination should be performed. The diagnosis can usually be confirmed via ultrasound [177,178]. Voiding cystography is only indicated when the child also presents with a UTI or when the ultrasound shows signs of upper tract abnormalities [179]. If a UR is symptomatic, the standard approach is the surgical removal of the remnant. However, in children younger than 6 mo, even when symptomatic, a conservative approach with observation and/or antibiotics is possible, as there is a high chance of spontaneous resolution [176,180–183]. In the event of active inflammation/infection, this should be treated first, and surgery should preferably be done electively. Urachal cancer has not been observed in children. Gleason et al [184] found that 5721 URs would need to be excised to prevent a single case of urachal adenocarcinoma.

3.9. *Transitional urology*

Transition in urology involves shifting care responsibility from paediatric to adult health care systems for young people with a congenital or acquired urological condition. The goals are to maintain renal function, ensure continence, address sexual health and infertility issues, and monitor disease progression. This transition is challenging because of individual variations in psychosocial development, puberty, and medical needs [185–187]. Transition barriers arise from diverse expectations among patients, caregivers, and urologists. Adolescents often seek independence, while paediatric urologists might increase visits to prepare them for adult care. Caregivers may be hesitant to leave the familiar paediatric environment. Adult urologists require expertise in congenital urological conditions and should work in multidisciplinary teams for comprehensive patient care. Effective communication among specialties (eg, nephrology, gynaecology, rehabilitation) is crucial for seamless transition [185–188].

The optimal age for transitioning is personalised, with discussions often started when the child is aged 12–16 yr. Gradual introductions to adult providers help in building trust. Early planning in childhood focuses on setting long-term health and independence goals [189]. Adolescents should develop self-management skills and a care plan to foster autonomy [190]. The National Alliance to Advance Adolescent Health outlines six core transition elements, including readiness assessments to gauge when patients are prepared to shift to adult care (https://www.gottransition.org/six-core-elements) [191].

Specific transitional considerations for adolescents with neurogenic bladder, posterior urethral valves, hypospadias, bladder exstrophy/epispadias, and differences of sex development are included in the full version of the guidelines.

4. Conclusions

UDT is one of the most common congenital malformations, with early surgical correction of UDT is highly recommended before the age of 12 mo, and by 18 mo at the latest, for preservation of fertility potential. Testicular tumours in prepubertal boys are rare and mostly benign. To confirm the diagnosis, a high-resolution Doppler ultrasound examination should be performed. Testis-sparing surgery, with the option of intraoperative frozen section, should be performed whenever possible. Testicular torsion is a paediatric urological emergency and requires immediate treatment. The use of Doppler ultrasound to evaluate acute scrotum is useful, but this should not delay any intervention. Counsel caregivers on the functional and aesthetic value of corrective surgery for hypospadias and possible complications. Ensure long-term follow-up to detect urethral stricture, voiding dysfunction, recurrent penile curvature, and ejaculation disorder, and to evaluate patient satisfaction. Perform surgery in CPC if the curvature has functional implications. Perform artificial erection at the beginning and at the end of surgery. Perform renal and bladder ultrasound within 24 h in infants with febrile UTI and acutely ill children to check for abnormalities of the urinary tract. Assess bladder and bowel dysfunction and LUT function in any toilet-trained child with febrile and/or recurrent UTI and treat any condition identified. When evaluating a child with a daytime LUT condition, a comprehensive medical history, voiding diary, rectal diameter, urinalysis and urinary culture, and uroflowmetry with measurement of postvoid residual volume are indicated. Treatment of daytime LUT conditions involves a multimodal approach that can include behaviour modification, medical treatment, neuromodulation, and surgical treatment. URs include urachal sinus, urachal cyst, vesicourachal diverticulum, and patent urachus. In most cases, UR is asymptomatic. If a UR is symptomatic, the standard approach is surgical removal. However in children younger than 6 mo, even when symptomatic, a conservative approach with observation and/or antibiotics is possible, as there is a high chance of spontaneous resolution. Start transition to adult care at the onset of adolescence in a process involving both paediatric and adult urology providers in a multidisciplinary approach to ensure better transition readiness and subsequent adult adherence to clinical management.

The recommendations are listed in Table 1.

Author contributions: Christian Radmayr had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Skott, Kennedy, Gnech, van Uitert, Bujons, ‘t Hoen, Rawashdeh, Selcuk Silay, O’Kelly, Quaedackers, Pakkasjärvi, Yuan, Burgu, Castagnetti, Bogaert, Radmayr.
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Table 1 – Summary of recommendations

Recommendation	Strength rating
Management of undescended testis	
Do not offer medical or surgical treatment for retractile testes, but undertake close follow-up on a regular basis until puberty.	Strong
Do not offer hormonal therapy in cases with unilateral undescended testes for testicular descent only.	Strong
Offer endocrine treatment in cases of bilateral undescended testes to preserve future fertility potential.	Weak
Perform surgical orchidofunicolysis and orchidopexy before the age of 12 mo, and by 18 mo at the latest.	Strong
Perform an endocrinology workup in the setting of bilateral nonpalpable testes.	Strong
Perform an examination under anaesthesia and subsequent diagnostic laparoscopy to locate an intra-abdominal testicle.	Strong
Inform the patient/caregivers about the higher risk of malignancy with an undescended testis that increases with the age at orchidopexy.	Weak
Testicular tumours in prepubertal boys	
High-resolution ultrasound (7.5–12.5 MHz), preferably Doppler ultrasound, should be performed to confirm the diagnosis.	Strong
α-Fetoprotein should be determined in prepubertal boys with a testicular tumour before surgery.	Strong
Surgical exploration should be performed, with the option for frozen intraoperative section.	Strong
Testicular sparing surgery should be performed in all benign tumours.	Strong
Staging (MRI abdomen/CT chest) should only be performed in patients with a malignant tumour to exclude metastases.	Strong
Patients with a non–organ-confined tumour should be treated in a multidisciplinary fashion including paediatric oncologists.	Strong
Acute scrotum	
Testicular torsion is a paediatric urological emergency and requires immediate treatment.	Strong
In neonates with testicular torsion, perform orchidopexy of the contralateral testicle. In prenatal torsion, the timing of surgery is usually dictated by clinical findings.	Weak
Base the clinical diagnosis on a physical examination. The use of Doppler ultrasound to evaluate acute scrotum is useful, but this should not delay any intervention.	Strong
Manage torsion of the appendix testis conservatively. Perform surgical exploration in equivocal cases and in patients with persistent pain.	Strong
Hypospadias	
Differentiate isolated hypospadias from disorders of sex development at birth.	Strong
Counsel caregivers on the functional and aesthetic value of corrective surgery for hypospadias and possible complications.	Strong
Use the treatment algorithm in Fig. 2 to select the most appropriate surgical technique.	Strong
Correct significant (>30°) curvature of the penis.	Weak
Ensure long-term follow-up to detect urethral stricture, voiding dysfunction, recurrent penile curvature, and ejaculation disorder, and to evaluate patient satisfaction.	Strong
Congenital penile curvature	
Ensure that a thorough medical history is taken and a full clinical examination is performed to rule out associated anomalies in boys presenting with congenital penile curvature.	Strong
Request photographic documentation of the erect penis from different angles as a prerequisite for preoperative evaluation.	Strong
Perform surgery if the penile curvature has functional implications.	Strong
Perform artificial erection at the beginning and end of any surgery.	Strong
Urinary tract infection	
Take a detailed medical history, assess clinical signs and symptoms, and perform a physical examination in the evaluation of children suspected of having UTI.	Strong
Use bladder catheterisation or suprapubic bladder aspiration to collect urine for urinalysis and cultures in non–toilet-trained children.	Strong
Use clean catch urine for UTI screening in non–toilet-trained children.	Weak
Do not use plastic bags for urine sampling in non–toilet-trained children.	Strong
Use midstream urine in toilet-trained children for analysis and culture.	Strong
Perform renal and bladder ultrasound within 24 h in infants with febrile UTI and acutely ill children to check for abnormalities of the urinary tract.	Strong
Consider VCUG in the follow-up for patients who develop febrile UTI at <1 yr of age and those with atypical infections, recurrent infections, or ultrasound abnormalities.	Weak
Consider a DMSA scan at least 6 mo after a febrile UTI to assess kidney function and the presence of renal scars.	Weak
Treat febrile UTIs with a 4–7-d course of oral or parenteral therapy.	Strong
Chose parenteral therapy in severely ill patients or if oral treatment is not tolerated.	Strong
Treat complicated febrile UTI with broad-spectrum antibiotics.	Strong
Consider urinary drainage in patients with UTIs unresponsive to antibiotic treatment.	Weak
Offer antibacterial prophylaxis in patients at risk of recurrent UTIs.	Strong
Consider dietary supplementation as an alternative or add-on preventive measure in selected cases.	Weak
Offer treatment for phimosis to patients with underlying urological conditions.	Weak
Assess bladder-bowel dysfunction and LUT function in any toilet-trained child with febrile and/or recurrent UTI and treat any condition identified.	Strong
Daytime LUT conditions	
Use 2-d voiding diaries and/or structured questionnaires for objective evaluation of symptoms, voiding and drinking habits, and response to treatment.	Strong
Use a stepwise approach, starting with the least invasive treatment, in managing daytime lower LUT conditions in children (Fig. 4).	Strong
Provide adequate bowel management as part of the treatment if bladder-bowel dysfunction is present.	Strong
Re-evaluate in cases of treatment failure; this may consist of (video) urodynamics, MRI of the lumbosacral spine, and cystoscopy.	Weak
Arrange adequate transition to adult urological care for children with persistent daytime LUT conditions in adolescence.	Strong
Rare conditions in childhood: UR	
Manage asymptomatic URs conservatively.	Strong
Manage symptomatic URs conservatively with observation and/or antibiotics initially, and then preferably with elective surgical removal if persistent.	Weak
Remove symptomatic URs using an open, laparoscopic, or robotic approach.	Strong
Do not perform VCUG for asymptomatic UR.	Weak
Transitional urology	
Develop a standardised transition-of-care programme and collaborate with adult providers to facilitate safe, successful, and sustainable transition to adult urology care.	Strong
Start transition at the onset of adolescence and involve both paediatric and adult urology providers in a multidisciplinary approach to ensure better transition readiness and subsequent adherence to adult clinical management.	Weak
Use a validated transition assessment tool to objectively assess transition readiness.	Strong

CT = computed tomography; DMSA = dimercaptosuccinic acid; LUT = lower urinary tract; MRI = magnetic resonance imaging; UR = urachal remnant; UTI = urinary tract infection; VCUG = voiding cystourethrogram.

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