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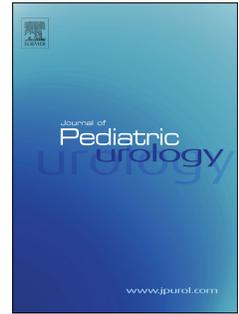
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Clinical and surgical consequences of the COVID-19 pandemic for patients with pediatric urological problems.

Statement of the EAU guidelines panel for paediatric urology, March 30 2020.

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Abstract

The COVID-19-pandemic forces hospitals to reorganize into a dual patient flow system. Healthcare professionals are forced to make decisions in patient prioritization throughout specialties. Most pediatric urology pathologies do not require immediate or urgent care, however, delay may compromise future renal function or fertility. Contact with patients and parents, either physical in safe conditions or by (video)telephone must continue.

The Paediatric-Urology-Guidelines-panel of the EAU proposes recommendations on prioritization of care. Pediatric-Urology program directors must ensure education, safety and attention for mental health of staff. Upon resumption of care, adequate prioritization must ensure minimal impact on outcome.

Introduction

COVID-19 is spreading rapidly around the world, forcing previously unknown changes in our health care systems. This pandemic poses a great burden on medical resources such as hospital beds and protective equipment, in addition to medical personnel. Decisions regarding which type of care is to be continued and which can be postponed must be made and will require revision as the situation improves or worsens. It is yet unpredictable when to expect improvement in the COVID-19 situation, but this will also require a scenario for progressive resumption of medical care. Several medical and surgical societies across the globe have developed lists to guide the decision-making process with regards to reduction of care, mainly focusing on adult patients or paediatric surgery in general.

We present a statement with recommendations for pediatric urological cases based on published studies as well as expert opinion of the paediatric urology guidelines panel of the EAU. However, sound clinical judgement and the local situation or regulations will influence individual decisions.

Children and COVID-19

COVID-19 appears similar to Severe Acute Respiratory Syndrome Corona virus (SARSCoV) and Middle East Respiratory Syndrome Corona virus (MERSCoV). With these epidemics severe symptoms of infection were relatively uncommon in children. To date most reports on COVID-19 in children describe mild to moderate symptoms such as fever, cough and nasal discharge [1]. The prevalence of severe symptoms is higher among children <5 years old, particularly <1-year-old [1].

While most children themselves may not be severely ill with COVID-19, this pandemic will impact on pediatric urological care. Careful decisions must be made on what care requires postponement and what care is essential to be continued.

Suggested reduction in surgical procedures during various stages of severity of the COVID-19 pandemic.

Below are recommendations for paediatric urological surgical procedures. For stage 1 & 2 suggestions include care that can be postponed. Conversely, for stage 3 & 4 suggestions encompass essential care that should continue, circumstances permitting.

Stage 1:

Start to reduce surgical cases.

High recommendation to postpone:

- Benign scrotal & penile surgery: orchiopey, hydrocele, inguinal hernia, circumcision.
- Functional surgery: incontinence surgery, meatotomy, botulinum injections.
- Genital reconstructive surgery: hypospadias, buried penis, other genital abnormalities.

- Benign (hemi)nephrectomy.
- Bladder-augmentation, catheterizable stoma, appendicocoecostomy, due to the high and prolonged impact on patients as well as and resources.
- Consider postponing bladder exstrophy correction depending on the age of the child and local situation.

Stage 2

Perform only care that is at least semi-urgent.

Recommendation to postpone:

- Surgery for vesicoureteral reflux: endoscopic bulk-injection or ureteral reimplantation.
- Pyeloplasty in UPJ obstruction without loss of differential function.
- Urolithiasis without infection or obstruction.
- Endoscopic botulinum-toxin for neurogenic bladder dysfunction: only continue in selected cases.

Stage 3:

Still perform surgery for urgent cases in which delay will cause irreversible progression of disease or organ damage:

- Pyeloplasty in UPJ obstruction with progressive loss of differential function or severe symptoms.
Consider postponing reconstruction and draining the kidney by JJ catheter or nephrostomy depending on local situation.
- Posterior urethral valves (PUV).
- Obstructed megaureter with progressive loss of differential function.
- Urolithiasis with recurring febrile infections

Stage 4

Perform surgery only in cases of organ-threatening or life-threatening disease:

- Urosepsis with obstruction:
e.g. urosepsis with urolithiasis, obstructing ureterocele, or obstructed megaureter.
- Trauma with hemodynamic instability (endovascular or surgical procedures) or urinary leakage.
- Posterior urethral valves (PUV): only in case transurethral catheter cannot be placed.
- Oncology:
Wilms tumor, malignant testicular / paratesticular (rhabdomyosarcoma) tumors, rhabdomyosarcoma of the bladder or the prostate. Continue diagnostic procedures prior to non-surgical therapy. Surgical resection may be considered depending on the local situation, condition of the child and expected duration of stage 4.
- Acute ischemia:
(Non-neonatal) testicular torsion with pain. In neonates it may be decided not to explore testicular torsion due to the lower chances of salvage of the testis, very low risk of metachronous contralateral torsion and the increased vulnerability of these patients, particularly if the torsion is relatively asymptomatic [2].
- Paraphimosis (preferably under local anesthesia) [3]

It is important to note that postponing surgery in patients with obstructive uropathy (e.g. UPJ/UVJ obstruction, PUV and neurogenic bladder) may lead to loss of renal function and the decision to postpone surgery may have to be revised depending on the duration of the local situation as well as the severity of obstruction in the individual case. Temporary drainage methods may be considered as a bridge to definitive surgery.

Surgery during the COVID-19 pandemic

If possible, each patient should be screened for COVID-19 prior to surgery. If the test-result is unknown, surgery should be performed as if the patient were positive.

The effect of surgery on either the susceptibility to COVID-19 or on the severity of symptoms is yet unknown. Still it may be useful to consider regional or local anesthesia whenever possible to prevent

the need for mechanical ventilation [3]. This also limits the use of ventilators and other potentially scarce equipment.

In case of surgery on a (potentially) COVID-19 positive patient several issues should be considered in order to limit the risk for theatre staff. The operating theatre poses different risks of exposure compared to non-surgical care. Therefore, it is important to limit the number of theatre staff present during surgery on a COVID-19 positive patient [4].

Diathermy smoke is a potential risk factor in spreading the Corona virus, as surgical smoke has been shown to contain several viruses in the past [5,6]. Aerosols from ultrasonic scalpels may pose a higher risk due to their lower temperature compared to aerosols from conventional diathermy [7]. It is advisable to use suction devices as much as possible.

There is no conclusive evidence regarding the differences in risks of open versus laparoscopic surgery for the surgical team [8]. However, laparoscopic surgery may be associated with a higher amount of smoke particles than open surgery [9]. During laparoscopy surgical smoke is released into theatre under pressure at several stages of surgery. It is advisable to keep intraperitoneal pressure as low as possible and to aspirate the inflated CO₂ as much as possible before removing the trocars [7,10].

In order to minimize the use of operating room time and optimize the use of resources surgery should be performed by experienced surgeons [10].

Outpatient care for children with urological problems during the COVID-19 pandemic

while the goal of pediatric urologists must be to maintain a high as possible standard of care, the number of patients attending the outpatient clinic must be reduced in order to minimize the chance of infecting patients or health care providers, as well as preserving personal protection equipment.

Each individual case should be screened for the possibility of replacing an outpatient visit by consultation via telephone or video-call, when available. Post-operative follow-up for genito-scrotal procedures may be aided by photographic documentation by caregivers and uploaded into patient files when possible (following the General Data Protection Regulation GDPR). A telephone consultation may also be used to screen for the need for physical consultation. If a physical outpatient clinic visit is necessary, the child should be accompanied by only a single caregiver.

Prior to the outpatient clinic visit it is also necessary to assess if either child or caregiver have symptoms that may be COVID-related. If there are COVID-19 symptoms, child or caregiver has been tested positive for COVID-19 or are in quarantine, they should be seen in a COVID-dedicated area of the hospital without interaction with other patients. For details on these procedures we refer to local guidelines.

Suggested reduction in outpatient clinic visits during various stages of severity of the COVID-19 pandemic.

Stage 1:

Start to reduce outpatient cases such as benign scrotal and penile pathology or well as incontinence.

Stage 2

See only cases that are at least semi-urgent, such as initial postoperative ultrasound after upper tract reconstruction. Consider postponing prolonged (post-operative) follow up in stable patients.

Stage 3:

Continue care for urgent cases in which delay may cause irreversible progression of disease or organ damage. This includes ultrasound and voiding cystography in suspected severely obstructive uropathy in which surgery is still considered.

Stage 4

Continue all care for cases in which a delay of care is potentially organ-threatening or life-threatening.

Safety measures and precautions for paediatric urology staff

As the infection rate of COVID-19 is reported between 40-70%, paediatric urology teams should be prepared for the chance to become infected and consider splitting up into 2 teams, aiming to assure the continuity in the hospital of at least 1 team [4,11].

Healthcare workers may be anxious about contracting COVID-19 and this causes an additional stress in already strained working conditions. Hospitals must ensure staff are sufficiently informed about COVID-19 disease, and trained in the use of protective equipment, isolation and infection control measures prior any contact with patients [12]. When available simulation exercises and e-learning, may aid to ensure optimal quality of care of COVID-19 patients and to maximally reduce the risk of viral transmission to other patients or healthcare workers [13].

Maintaining good mental health of all medical staff is extremely important to ensure a safe working environment [14]. Program directors should be aware of the importance the mental health of their staff and maintain contact with all staff members on a regular basis.

In addition to following local protocols, staff should be aware that in patients with clinical recovery from COVID-19 both stool and urine may still contain COVID-19 when oropharyngeal swabs have become negative [15].

Resumption of surgical care after the COVID-19-pandemic peak

While it cannot be predicted when we will be able to revert back from the high stages of the COVID-19 pandemic and resume more normal levels of care, we do need to plan ahead on how to do this.

The most logical step will be to reverse back through the aforementioned stages. During this process we will need to confer with our fellow surgical (sub)specialties to prioritize the available surgical time and resources among all surgical patients.

While it is wise to postpone surgery in cases of obstructive uropathy during the advanced stages of the COVID-19 pandemic, there is a risk of loss of renal function. The challenge will be to minimize this loss in children who have their whole lives ahead of them, particularly if the pandemic continues for a prolonged period of time. Children with obstructive uropathy should receive priority over other benign diseases in children or adults as soon as surgical schedules can be resumed.

Undoubtedly there will be cases of congenital abnormalities where the optimal surgical timepoint will be surpassed, such as hypospadias and cryptorchidism. These children may be at risk for suboptimal outcome or increased psychological burden due to delayed surgery and should be prioritized in the long waiting list that we will undoubtedly be facing on the other end of this crisis.

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