Kingston Hospital NHS
NHS Foundation Trust

Policy for the Review, Management and Treatment of Children with Abdominal Pain and Possible Appendicitis at Kingston Hospital

This policy sets out how children and young people presenting with abdominal pain and possible appendicitis should be managed from presentation in the Emergency Department through to surgical intervention and in-patient stay.

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1. Introduction

Appendicitis is one of the most common surgical emergencies in the U.K., and commonest in young adults.

There is a limited differential diagnosis in male children and pre-menarche female children who present with acute lower abdominal pain.

Presentation in children may not be classical and diagnosis requires additional clinical skills to elicit signs. Children may also progress rapidly to perforation therefore the **default clinical position in this age group should be that patients with acute lower abdominal pain have acute appendicitis until proven otherwise** by a short period of observation or at surgery.

The default position should be that all children with appendicitis should have an appendicectomy and where there is doubt, appendicectomy should be undertaken rather than observation for longer than 24 hours.

A delayed diagnosis of appendicitis will result in a septicaemic child with multi-organ failure often requiring transfer to a paediatric centre and HDU or PICU management.

This document defines children as patients less than 11 years of age, and young people as those 12-18 years of age.

2. Policy Objective

The purpose of this policy is to provide direction on how children and young people, presenting with abdominal pain and possible appendicitis, should be managed from presentation in the Emergency Department through to surgical intervention and in-patient stay.

3. Trust Equality Statement

This policy forms part of Kingston Hospital Trust's commitment to create a positive culture of respect for all individuals including staff, patients, their families and carers as well as community partners. The intention is to identify, remove or minimise discriminatory practice in the areas of race, disability, gender, sexual orientation, age and religion, belief, faith and spirituality, as well as to promote positive practice and value the diversity of all individuals and communities.

4. Scope

This policy applies to the care and treatment of children aged under the age of 19 years presenting with abdominal pain and possible appendicitis. It should be adhered to by all staff caring for and treating such children and young people.

5. Roles and Responsibilities

5.1 Lead Emergency Department (ED) Consultant for Paediatrics

The Lead Consultant for Paediatrics in the Emergency Department will ensure implementation of this policy within their area of responsibility. S/he will ensure that the

policy is adhered to with regard to the seniority of staff assessing the patients covered by this policy and that onward referral to other teams is adhered to as necessary.

5.2 Clinical Director for Paediatrics
The Clinical Director for Paediatrics will ensure implementation of this policy within their area of responsibility. S/he will ensure that the policy is adhered to with regard to the seniority of staff assessing the patients covered by this policy and that onward referral to other teams is adhered to as necessary.

5.3 Clinical Director for Surgery
The Clinical Director for Surgery will ensure implementation of this policy within their area of responsibility. S/he will ensure that the policy is adhered to with regard to the seniority of staff assessing the patients covered by this policy and that onward referral to other teams is adhered to as necessary. S/he is responsible for ensuring that, where an appendicectomy is undertaken, this is undertaken by an appropriately trained surgeon, as detailed in section 10 of this policy.

5.4 Surgery Consultant on call / Paediatric Registrar on call / Surgery Registrar on call – see Section 6 for details of responsibilities.

5.6 Lead Anaesthetist for Paediatrics
The Lead Anaesthetics for Paediatrics will ensure implementation of this policy within their area of responsibility and ensure that children and young people have their anaesthesia performed by an anaesthetist with suitable training and competencies.

5.7 Paediatric Matron
The Paediatric Matron is responsible for ensuring that all children and young people have a Paediatric Early Warning Score documented at all four hourly with appropriate escalation.

5.7 Acute Pain Team
The Acute Pain Team should review daily children and young people admitted as surgical in-patients.

5.8 Chair of Surgical/Anaesthetic and Paediatric Governance Meeting
The Chair of the above meeting should ensure that audit results, as detailed in the Monitoring section of this policy, are reviewed and discussed at least annually.

6. Management in the Emergency Department

This policy informs sections of the Emergency Department Surgical Referral Pathways guidance (Appendix 2).

6.1. Children Aged Five Years and Under

Children aged 5 years and under attending the Emergency Department (ED) with acute abdominal pain should be reviewed by an ED Registrar or Consultant.

Children aged 5 years and under should ideally have a waiting time in the Emergency Department of less than 1 hour before seeing a clinician.

A paediatric Alvarado score should be ascertained (Appendix 1).

If an acute abdominal condition is suspected the child should be discussed with the on-call Paediatric Registrar (bleep 732) who will review and manage the patient jointly with the team in the ED.

Patients requiring admission should be referred to the Paediatric Surgery Department at St George's Hospital.

Resuscitation and transfer of these patients is the shared responsibility of the Paediatric and ED teams and transfer arrangements may be made by the most appropriate of either of these teams workload dependent, but the ultimate responsibility for ensuring management and transfer takes place lies with the on call Paediatric team.

St George's Hospital Paediatric Surgery Department is our local tertiary paediatric surgical referral centre, and should always be the first contact when needing to transfer these patients. Whilst they will make every effort to accommodate these patients, if they are unable to do so, referral to one of the other tertiary paediatric surgical centres should be made.

Patients discharged home after a period of observation should be given explicit instructions to return if symptoms do not settle or become worse, and given the Paediatric abdominal pain information leaflet.

6.2. Children Aged 6 years to 10 years inclusive

Children aged 6 years and above attending the Emergency Department (ED) with acute abdominal pain should be reviewed by an ED Registrar or Consultant and an Alvarado score ascertained. In view of this the routine blood tests and urinalysis for this score should be carried out by the ED before referral; however availability of results should not delay acceptance of the referral and subsequent review.

The following blood tests should be requested as a minimum: Full blood count, c-reactive protein, urea and electrolytes. Other blood tests may be required depending on medical co-morbidities.

If an acute abdominal condition is suspected the child should be referred to the Surgical Registrar on call and the on-call Paediatric Registrar for review by both, in person and resuscitation started in the ED.

The patient should be discussed with the Surgical Consultant on call. It is the responsibility of the Surgical Registrar to undertake this consultation. If a decision is made to transfer a child to a paediatric surgical unit, it is the responsibility of the Surgical Registrar to arrange this. If the child is clinically unwell with a suspected perforation, transfer to a regional unit with both PICU and paediatric surgery may be necessary. In these circumstances, retrieval of the child via the South Thames Retrieval Service may be required which should be facilitated by the on-call Paediatric Registrar.

Patients discharged home after a period of observation should be given explicit instructions to return if symptoms do not settle or become worse, and given the Paediatric abdominal pain information leaflet. Admission to the paediatric ward at Kingston Hospital should be arranged by the on call Surgical team. The child will remain under joint care with paediatrics for the duration of the admission.

All patients should have the Paediatric Alvarado Score and the likelihood of appendicitis documented in the notes before leaving the ED.

2.3 Children and Young People aged 11 years and above

Children and young people aged 11 years and above attending the Emergency Department (ED) with acute abdominal pain should be reviewed by an ED Registrar or Consultant and an Alvarado score ascertained. In view of this the routine blood tests and urinalysis for this score should be carried out by the ED before referral. However, availability of results should not delay acceptance of the referral and subsequent review.

The following blood tests should be requested as a minimum: Full blood count, c-reactive protein, urea and electrolytes. Others blood tests may be required depending on medical co-morbidities.

If an acute abdominal condition is suspected the child should be referred to the Surgical Registrar on call for review in person and resuscitation started in the ED as necessary.

If requiring admission these patients are admitted under the joint care of the surgeons and paediatricians (as per paediatric ward operational policy) but it remains the surgical team's responsibility to arrange the admission.

Patients discharged home after a period of observation should be given explicit instructions to return if symptoms do not settle or become worse, and given the Paediatric abdominal pain information leaflet.

7. Antibiotic Policy

Routine antibiotics *should not* be started on patients where the diagnosis is not certain.

If there an agreed diagnosis between the medical and surgical teams of another septic condition, antibiotics should be started as appropriate.
Please note that urinary symptoms, proteinuria and sterile pyuria are common presentations of children with appendicitis and a suspected urinary tract infection does not exclude appendicitis.

For patients with suspected appendicitis, only patients in whom a decision for surgery has been made should be started on antibiotics. **Therefore, starting antibiotics in a patient being observed for possible appendicitis requires that the patient will have an appendicectomy.**

8. Ward Management

It is a universal policy at Kingston Hospital that ***all*** patients admitted by the surgical team to the paediatric ward are under shared care between the Emergency Surgical and Paediatric teams.

All children should have an observation chart and have their PEWS (Paediatric Early Warning Score) criteria documented at least 4 hourly with appropriate escalation for the colour zone triggered as per the chart. Please refer to the Acute Paediatric Observation and PEWS policy.

Children admitted with suspected appendicitis should be reviewed by a consultant surgeon on admission or on the morning or evening ward round after admission and prior to the administration of antibiotics.

If there is a difference of opinion between the surgical and paediatric teams regarding diagnosis or management of a child, one or other of the following should occur:

a. A second opinion should be sought from a senior surgical consultant if available.
b. A second opinion should be sought from the St George's Hospital Paediatric Surgery team.

Seeking a second opinion can be undertaken by either team irrespective of the opinion of the other.

Patients with unexplained sepsis and abdominal pain or without certain diagnosis still undergoing observation after 24 hours should be discussed with the paediatric surgeons on call at St George's Hospital for advice.

Patients discharged home after a period of observation should be given explicit instructions to return if symptoms do not settle or become worse, and given the Paediatric abdominal pain information leaflet.

9. The Use of Diagnostics

9.1. Blood tests and Urinalysis

These have been defined in Section 2.

9.2. Abdominopelvic Ultrasound

If diagnostic radiology is considered necessary for patients with suspected appendicitis, abdominopelvic ultrasound scanning is the investigation of choice. This investigation is only useful if appendicitis is confirmed. Overall, it is not considered a good diagnostic tool for diagnosing acute appendicitis as it has a false negative rate of at least 20%. **The default position for the management of suspected appendicitis is appendicectomy NOT ultrasound**.

If the patient has a right iliac fossa mass, abdominopelvic ultrasound is a more useful investigation and should be obtained to determine the nature of the mass and any abscess formation. The treatment of stable patients with a right iliac fossa mass consistent with acute appendicitis may be treated with antibiotics. Such patients should be monitored closely for improvement or deterioration.

Ultrasound may rule in a positive alternative diagnosis that does not require surgery. **A negative ultrasound does not exclude surgery**.

9.3. Abdominal CT or MRI

These investigations should be considered only if there is significant lack of clarity or disagreement over the cause of the abdominal pain; these patients should therefore be referred to the St George's Hospital paediatric surgeons for review and investigation: these investigations should not be performed at Kingston Hospital.

10. Surgery

Patients with a diagnosis of appendicitis should have an appendicectomy.

Patients with suspected appendicitis who are started on antibiotics must have an appendicectomy.

Children aged 6 to 10 years should have an open appendicectomy unless performed by a consultant with specific expertise in paediatric laparoscopic surgery. A Consultant surgeon should perform the surgery or directly supervised (Consultant present in theatre), appropriately trained senior HST.

Between 11 and 16 years the default operation is an open appendicectomy unless the surgeon has had an accredited track record in the laparoscopic technique. If a laparoscopic operation is preferred this should be performed by a consultant or observed directly by a consultant when being performed by an experienced HST. A consultant surgeon should be present in theatre during surgery for all procedures in those under 16.

Failure to find the appendix or progress during the operation should immediately result in calling the consultant surgeon on call if not already present.

If a child undergoes a right iliac fossa gridiron incision the appendix should always be removed irrespective of other findings to prevent confusion in the future should there be further pain. In laparoscopic cases if no cause can be found for the abdominal pain the appendix should be removed even if it appears normal.

The appendix should always be sent for histology.

It is acceptable that up to 20% of patients who undergo appendicectomy have a normal histological appendix.

11. Anaesthetics

The on-call emergency anaesthetic team (bleep 040) should be informed of the decision for surgery at the time this is made and the patient should be booked for theatre, ideally as the first/next patient on the emergency list, where clinical priority allows.

The SBAR communication tool (Situation, Background, Assessment, Recommendations) should be used by all staff when describing a child's condition to a colleague.

With regards to emergency surgery, the anaesthetic pre-assessment must include the timely provision of measures to maximise symptom relief (analgesia) and minimise distress (unnecessary fasting, including prescription of isotonic intravenous fluids).

All anaesthetists with a CCT or equivalent will have obtained higher paediatric anaesthetic training. As a minimum, they should be competent to provide peri-operative care for common emergency surgical conditions in normally healthy children aged three years and older. It is therefore expected that anaesthesia for most children above 6 years of age for appendicitis will take place at Kingston Hospital.

All children under the age of 11 must have their emergency anaesthesia directly supervised by a Consultant Anaesthetist in theatre. Above this age, and for appropriate patients, anaesthesia may be performed by SAS/SD or trainee anaesthetists with suitable training and competencies; access to a responsible Consultant Anaesthetist is still required.

In children, flushing of intravenous cannulas is a mandatory responsibility of the anaesthetist before discharge to the post-operative recovery area. The post-operative analgesic and fluid management plan must be clearly handed over to the recovery and/or paediatric ward staff, with appropriate Trust pain management documents as indicated.

Children admitted as surgical inpatients must be reviewed daily by the Acute Pain Team.

Analgesia regimes should be simple to follow and administered by a route acceptable to children and parents.

Children with significant co-morbidities or sepsis, who are likely to require High Dependency or Intensive Care post-operatively, must be transferred to a tertiary centre with these facilities before surgery. In the event that a child requires in-hospital stabilisation before transfer to a specialist centre for surgery, the on-call paediatric and anaesthetic teams should be contacted, as required.

Critically ill children must be managed with the early and direct involvement of the on-call Consultant Paediatrician and General Anaesthetist. They must work as part of a multi-disciplinary team to stabilise and initiate treatment, prior to the arrival of a regional paediatric retrieval team (South Thames Retrieval Service). In certain circumstances a child may have to be transferred by the referring hospital - this must be done by the most appropriate senior member of the anaesthetic team.

The patient remains the responsibility of the Trust until the child has reached the tertiary centre - the child must be made known to all relevant teams (including during handovers) until this time. The Trust will support clinicians when there are unexpected circumstances requiring that they act beyond their routine practised competencies and are undertaking life-saving interventions in children who cannot be transferred or cannot wait for a designated surgeon or anaesthetist. In this situation advice should be sought from the on-call Consultant Paediatric Surgeon and Anaesthetist at St. George's Hospital.

12. Implementation

The department of surgery will undertake in house training in the management of appendicitis for all new HSTs and CTs to reinforce this policy and ensure that both open and laparoscopic appendicectomy are undertaken to an acceptable standard.

This policy is to be incorporated into the induction for all new junior staff in the Surgical Department, Emergency Department and Department of Paediatrics.

This policy will be communicated to all relevant staff via appropriate clinical staff meetings and be placed on the Trust's intranet.

13. Monitoring

A prospective audit of all patients aged 6 to 18 years with suspected appendicitis for two months each year to be undertaken through the Surgery Department into the percentage of patients given an Alverado score and the outcome of the admission episode. This will be presented at the quarterly joint Surgical/Anaesthetic and Paediatric Governance Meeting.

The PEWS criteria and defined levels of escalation are embedded into practice on the paediatric wards as per the Acute Paediatric Observation and PEWS policy and included in Trust wide audits.

Element to be monitored	Position responsible for monitoring	Method	Frequency	Reporting arrangements
Patients admitted with suspected appendicitis – Alverado score and admission outcome	General Surgery Clinical Audit Lead	Audit	Annual	Joint Surgical, Anaesthetic and Paediatric Governance meeting
Paediatric Early Warning Score	NEWS Group	Audit	Monthly	NEWS Group

14. Associated Documentation

Acute Paediatric Observation and PEWS policy

Appendix 1: The Alvarado Score

	No	Yes
Symptoms		
Pain migrating to the right lower quadrant	0	1
Anorexia (adults) or Urinary Ketones (children)	0	1
Nausea or Vomiting	0	1
Signs		
Right lower quadrant tenderness	0	2
Rebound Tenderness	0	1
Fever >37.3	0	1
Laboratory Values		
Leucocytosis	0	2
Neutrophilia	0	1

A score of 5 or 6 is compatible with the diagnosis of acute appendicitis. A score of 7 or 8 indicates probable appendicitis, and a score of 9 or 10 indicates a very probable acute appendicitis.

Appendix 2: Emergency Department Surgical Referral Pathways

EMERGENCY DEPARTMENT
ACCEPTED SURGICAL REFERRAL PATHWAYS
To be read in conjunction with: 'Policy document for the review, management and treatment of children with abdominal pain and possible appendicitis at Kingston Hospital', April 2017

1. **All surgical referrals for adults** will be from the ED ST4+ (or equivalent) *or* the ED Consultant to the SHO (or equivalent) in surgery.

2. The surgical doctor will provide the referring doctor with an estimated time to assessment.

3. In cases of delay to surgical assessment, the escalation from the ED would be another bleep to the SHO, then escalation to the Surgical Registrar and then the Consultant in Surgery.

4. **No children between 0 and 5 years are to be referred to the surgical team at Kingston.**

   All children presenting to the ED with acute abdominal pain must be reviewed by an ED Registrar or Consultant. The ED will contact the Paediatric Surgical Registrar at St George's directly for advice and arrange transfer as appropriate.

   If an acute abdominal condition is suspected in the ED, the child should also be referred to the Paediatric Registrar for review. If the child is being managed by a suitably qualified Consultant in Paediatric Emergency Medicine, the referral to the Paediatric Registrar may be omitted at the discretion of the Consultant. Intravenous cannulation, routine bloods and fluid resuscitation should be commenced in the ED prior to transfer and it is the responsibility of the ED to undertake this. A Paediatric Alvaraldo score should be calculated and documented in the notes.

   Equally, any child aged between 0 and 5 years admitted under the paediatric team who subsequently develops a surgical problem will be referred by the paediatric team directly to the paediatric surgeons at St George's.

5. **Children over 6 years and less than 18 years** presenting with acute abdominal pain to the ED will be reviewed by the ED Registrar *or* Consultant. If an acute abdominal condition is suspected, the ED Registrar or Consultant should refer the child to the Surgical Registrar **and*, if the child is under 11 years of age*,** the on-call Paediatric Registrar. It is expected that both the Surgical and Paediatric Registrars will review the child in person while in the ED.

   It is the responsibility of the ED to undertake intravenous cannulation, routine bloods and urinalysis prior to referral and to commence fluid resuscitation as required. A Paediatric Alvaraldo score should be calculated and documented in the notes as appropriate.

   The Surgical Registrar should discuss the case with the on-call Surgical Consultant to determine the suitability of the child to be admitted at Kingston for either further investigation or definitive management. If the Surgical Consultant does not feel that the child should be admitted at Kingston, the surgical team will be responsible for discussing the case with the Paediatric Surgeons at St George's and arrange transfer

accordingly. If a child is septic from a suspected perforation and requires PICU support, retrieval via STRS will be facilitated by the Paediatric Registrar.

6. All children aged over 6 years admitted to Kingston with a suspected acute abdomen will be under the joint care of the Paediatric and Surgical teams.