

LITIGATION
09 JUL 2012
SERVICES

Witness Statement Ref. No.

254/1

NAME OF CHILD: RAYCHEL FERGUSON

Name: B Kelly

Title: Doctor

Present position and institution:

GP Principal
Springfield Rd Surgery
66-70 Springfield Rd
Belfast
BT12 7AH

Previous position and institution:

[As at the time of the child's death]

Senior House Officer working in Accident and Emergency Dept, Altnagelvin Hospital.

Membership of Advisory Panels and Committees:

[Identify by date and title all of those between January 1995 - April 2012]

Appointed March 2012- Appeal Tribunals: Medical Member

Previous Statements, Depositions and Reports:

[Identify by date and title all those made in relation to the child's death]

None

OFFICIAL USE:

List of previous statements, depositions and reports attached:

Ref:	Date:	

IMPORTANT INSTRUCTIONS FOR ANSWERING:

Please attach additional sheets if more space is required. Please identify clearly any document to which you refer or rely upon for your answer. If the document has an Inquiry reference number, e.g. Ref: 049-001-001 which is 'Chart No.1 Old Notes', then please provide that number.

If the document does not have an Inquiry reference number, then please provide a copy of the document attached

I. QUERIES IN RELATION TO YOUR MEDICAL QUALIFICATIONS, EXPERIENCE, TRAINING AND RESPONSIBILITIES

(1) Please provide the following information:

- (a) State your medical qualifications and the date you qualified as a doctor. **MB, BAO, MPHIL, MRCP. Qualified- July 1999 from Queens University Belfast.**
- (b) Describe your career history before you were appointed to Altnagelvin Hospital.

Prior to working in Altnagelvin I undertook my Junior House Officer Job in Blackpool Victoria Hospital. This was a one year job. I was allocated to three 4 monthly attachments gaining experience in Medicine/Surgery/General Practice.

- (c) State the date of your appointment to Altnagelvin Hospital and the capacity in which you were employed. **I was appointed to a two year post in August 2000 to undertake the two year SHO GP scheme.**
- (d) Describe your work commitments to the Altnagelvin Hospital from the date of your appointment to the 7th June 2001, stating the locations in which you worked and the periods of time in each department/location.

August 2000-February 2001 I worked as a medical SHO attached to the Geriatric Unit (August-November) and Cardiology Unit (November-February).

February 2001-August 2001- I worked as (SHO) casualty officer .

- (e) Describe your duties in the accident and emergency department of Altnagelvin Hospital on the 7th June 2001. **My duties involved the participation in the active treatment of all patients attending the Accident and Emergency Dept.**
- (f) By the 7th June 2001, quantify your experience of working with children. **I would have gained experience of children's health care during my Surgical attachment and General Practice attachment in Blackpool Victoria Hospital. By June 2011 I would have worked within the Altnagelvin Accident and Emergency Dept for 4 months and would have been involved in the provision to care of children throughout this period.**

- (2) At the time of your appointment to Altnagelvin Hospital were you provided with training or induction and if so,
- (a) Describe the training or induction which you received. **I would have been provided with an Induction period for each of the specialties I was attached to throughout my two year rotation in Altnagelvin.**
 - (b) State the date or the approximate date when you received any training or induction. **I am unable to recall dates but it would have been at the initial stages of each attachment and then there was continuous organized educational training throughout my attachments.**
 - (c) Identify the person(s) who delivered this training or induction. **I am unable to recall who provided training.**
 - (d) Indicate if you received any documentation at this training or induction. **I would often have received written educational information but am unable to recall specific details of these.**
- (3) Provide full details of any advice, training or instruction which was provided to you at Altnagelvin Hospital in order to inform you of any of the following matters:
- Hyponatraemia- **I am unable to recall any specific training regarding the condition of Hyponatraemia.**
 - Post-Operative Fluid Management **I am unable to recall any specific training regarding the post operative fluid management.**
 - Record keeping regarding fluid management **I am unable to recall any specific training regarding the record keeping of fluid management.**

And address the following:-

- (a) Who provided this advice, training or instruction to you? **As above- unable to recall any specific training in this area.**
- (b) When was it provided? **As above- unable to recall any specific training in this area.**
- (c) What form did it take? **As above- unable to recall any specific training in this area.**
- (d) What information were you given? **As above- unable to recall any specific training in this area.**
- (e) In particular what information were you given in relation to the allocation of responsibility for prescribing intravenous fluids for post-operative children? **As above- unable to recall any specific training in this area.**

II. QUERIES ARISING OUT OF YOUR CONTACT WITH RAYCHEL FERGUSON ON THE 7th JUNE 2001

- (4) What time had you started working on the 7th June 2001? **Having consulted the Hospital, I understand that my shift started at 4pm.**
- (5) Clarify whether the accident and emergency record contained at Ref: 020-006-010 was a record made by you? **The record contained at Ref: 020-006-010 has my signature and a significant amount of the information provided has been written by myself.**
- (6) Did you make any other note or record in relation to your attendance on Raychel? **No, not that I can recall.**
- (7) Please outline what is recorded in the record contained at Ref: 020-006-010, and in particular address the following:
- (a) Describe Raychel's condition upon her attendance at the accident and emergency department. **I assessed Raychel at 8.05pm. Raychel was a 9 year old girl presenting with sudden onset of abdominal pains which began at 4.30pm on the 7th June 2001. Her pain had increased in severity from that time until she presented to Altnagelvin Accident and Emergency Department. She had been complaining of nausea but no vomiting. She had described pain on passing urine. Her temperature was 36C and Blood pressure 126/76. I examined her abdomen and found clinical signs of tenderness in right iliac fossa along with rebound tenderness and guarding. The pain was maximal over the McBurney's point. I, therefore, suspected appendicitis and asked the surgeons to assess her.**
 - (b) Describe Raychel's complaints upon presentation at the accident and emergency department. **As detailed above at section 7a.**
 - (c) How long (approximately) did you spend with Raychel? **I do not recall the duration spent with Raychel, at this far remove.**
 - (d) Was there any change in Raychel's condition or complaints during the period that you spent with her? **Not that I can recall.**
 - (e) Describe the examinations, if any, which you conducted on Raychel. **As detailed above at section 7a.**
 - (f) Describe your findings having carried out an examination on Raychel. **As detailed above at section 7a.**
 - (g) In the section marked "Diagnosis" the following words appear: "Appendicitis? Surgeons." Please explain what you meant when you wrote those words? **Raychel's clinical findings were suspicious of an Appendicitis and I therefore asked the surgical team to assess her.**
 - (h) If it is not otherwise clear from your earlier answers, did you arrive at a firm diagnosis, a differential diagnosis or were you unable to make any diagnosis? **I was suspicious of an Appendicitis.**

- (i) Outline fully your management plan for Raychel. **I asked the surgical team to assess Raychel .**
- (j) Describe any treatment you provided to Raychel, to include any medication or fluids which you provided for her. **At 8.20pm, I prescribed and administered IV Cyclimorph for pain relief.**
- (k) Did you write a prescription for any medication or fluids provided to Raychel? If so, identify that document? **As detailed in section 7j above, I prescribed IV cyclimorph. I see no documentation to suggest I prescribed or administered IV fluids.**
- (l) Please explain your reasons for providing any medication or fluids which you may have provided for Raychel. **Raychel was in pain and since I suspected appendicitis I was unable therefore to prescribe oral medication. Hence I prescribed IV analgesia.**
- (m) The record at Ref: 020-006-010 refers to "Drug treatment dispensed." It is indicated that Cyclimorph IV was prescribed by you, and that this was dispensed at 20.20. Please address the following matters which arise out of this record:
 - (i) Confirm that you prescribed and administered Cyclimorph IV to Raychel at 20.20 on the 7th June 2001. **That is my handwriting and signature for the IV cyclimorph.**
 - (ii) What factors did you take into account when deciding that it was appropriate to prescribe and administer this drug? **I suspected appendicitis. I was unable to prescribe oral analgesia as Raychel may have required an operation and she could therefore, have no oral intake. I therefore prescribed IV analgesia.**
 - (iii) Did you administer this drug before Raychel was examined by a surgeon? **I am unable to recall, at this far remove.**
 - (iv) If so, explain why you decided that it was appropriate to administer this drug before Raychel was examined by a surgeon? **As above.**
- (n) Did you have any communications with any member of the surgical team in relation to Raychel, her condition, your findings or any other matter? If so, please address the following matters:
 - (i) Who did you speak to? **I am unable to recall who from the surgical team I spoke with.**
 - (ii) What did you speak about? **I am unable to recall the exact details but most likely the patient's condition and need for surgical assessment.**
 - (iii) What information did you convey? **I am unable to recall the exact details but most likely the patients clinical findings.**
 - (iv) What information did you receive? **I am unable to recall the exact details but most likely I would have been told that the patient would be assessed by the surgical team.**

- (v) Did you discuss whether it was appropriate to proceed to theatre for an appendicectomy? **I am unable to recall, at this far remove.**
- (vi) Did you express any opinion on whether it was appropriate to proceed to theatre? **I am unable to recall, at this far remove.**
- (vii) What decisions were made on foot of any conversation with any member of the surgical team? **I am unable to recall but it is most likely that the surgical team agreed to admit this patient under their care to Ward 6.**

III GENERAL

Please address the following:

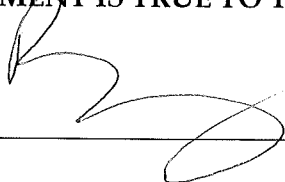
- (8) After Raychel's death were you asked to take part in any process designed to learn lessons from the care and treatment which she received and your role in it, to include any issue about her fluid management? If so,
 - (a) Describe the process which you participated in. **I was not asked to participate in any process designed to learn from the care and treatment that Raychel received.**
 - (b) Who conducted it? **Not applicable.**
 - (c) When was it conducted? **Not applicable.**
 - (d) What contribution did you make to it? **Not applicable.**
 - (e) Were you advised of the conclusions that were reached, and if so, what were they? **Not applicable.**
 - (f) Were you advised of any issues relating to your role in Raychel's care and treatment? **No.**
 - (g) Describe any changes to fluid management practice that you were made aware of at Altnagelvin Hospital following Raychel's death. **I was not asked to participate in any process designed to learn from the care and treatment that Raychel received.**
- (9) Provide any further points and comments that you wish to make, together with any documents, in relation to:
 - (a) The care and treatment of Raychel in Altnagelvin Hospital between the 7th - 9th June 2001. **I have no further comment to make.**
 - (b) Record keeping. **The processes and arrangements relating to record keeping were no different than from other hospitals which I had worked in.**
 - (c) Communications with Raychel's family about her condition, diagnosis, and care and treatment. **I have no comment to make.**

- (d) Working arrangements within the surgical team and support for junior doctors. **The processes and arrangements for support of Junior doctors were no different than from other hospitals which I had worked in.**
- (e) Lessons learned from Raychel's death and how that affected your practice at Altnagelvin or elsewhere. **I was not asked to participate in any process designed to learn from the care and treatment that Raychel received.**
- (f) Current Protocols and procedures. **I am unable to comment, given that I am now a GP Principal in a GP surgery.**
- (g) Any other relevant matter.

I have no further comment to make.

THIS STATEMENT IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF

Signed:



Dated:

23/6/12.

Curriculum Vitae: Dr Barry Kelly (GP Principal)

Full name: Barry Kelly
Address: c/o Springfield Rd Surgery, 66-70 Springfield Rd. Belfast
GMC: 4638984

Current post

I am working as a GP Principal (since my appointment in 2006) in a busy Belfast inner-city training practice with a branch surgery in the outskirts. I am the lead coordinator for the clinical areas Palliative, cancer and dementia care in the nGMS contract. I am the clinical governance lead for the practice.

I am involved in both undergraduate and postgraduate medical education and am currently undertaking a Masters in Medical education at QUB.

Qualifications

MB, Bch	BELFAST, QUB	JULY 1999
DIPLOMA GERIATRIC MEDICINE (DGM)	GLASGOW	APRIL 2002
DIPLOMA CHILD HEALTH (DCH)	DUBLIN, RCSI	NOV 2002
MRCGP	LONDON	JULY 2003
MPHIL	BELFAST, QUB	DEC 2006

Previous relevant employment

GP LOCUM	AUG 2004-SEPT 2005
GP REGISTRAR/ RESEARCH FELLOW ELMWOOD PRACTICE/ DEPT OF GENERAL PRACTICE 1 DUNLUCE AVE. BELFAST. BT8 8RY	AUG 2002-AUG 2004
SHO GP TRAINING SCHEME. ALTNAGELVIN AREA HOSPITAL LONDONDERRY	AUG 2000-AUG 2002
JHO BLACKPOOL VICTORIA HOSPITAL BLACKPOOL	AUG 1999-AUG 2000

OXFORD
HANDBOOK
OF ACCIDENT
& EMERGENCY
MEDICINE

- ◆ Step-by-step guidance on management
- ◆ Essential guide for junior doctors
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MEDICAL PROTECTION SOCIETY

Junior doctors and nurses working in an Accident and Emergency department are faced with a bewildering range of problems and challenges. Rapid decisions are required and the consequences of errors can be devastating. The *Oxford Handbook of Accident and Emergency Medicine* follows the style of the other highly successful Oxford Handbooks in providing practical guidelines on the management of a huge range of situations that present in A & E. For junior doctors, nurses, paramedics, and medical students, this book will be the essential guide.

Abbreviations and symbols

Normal values

- 1 General approach
- 2 Life-threatening emergencies
- 3 Medicine
- 4 Poisoning
- 5 Infectious diseases
- 6 Environmental emergencies
- 7 Analgesia and anaesthesia
- 8 Major trauma
- 9 Wounds and fractures
- 10 Surgery
- 11 Ophthalmology
- 12 Ear, nose, and throat
- 13 Obstetrics and gynaecology
- 14 Psychiatry
- 15 Paediatric emergencies

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Referring and handing over

The majority of patients seen in A&E will be examined, investigated, treated and subsequently discharged home with either no follow-up required, or advice to see their own GP (for suture removal, wound checks etc). Give these patients (and/or attending relative/friend) clear instructions on when to attend the GP for surgery and an indication of the likely course of events as well as any features that they should look out for to prompt them to seek medical help prior to that. *Formal written instructions* are particularly useful for patients with minor head injury (p384) and those with limbs in POP or other forms of cast immobilization (p474).

~10% of patients coming to A&E require referral to an in-patient team. If not handled correctly, this can cause considerable anxiety, misunderstanding, and potential conflict between A&E staff and other disciplines. Before making the referral ask the following questions:

Is it appropriate for this patient to be referred to the in-patient team?

In most cases this will be obvious. For example, a middle-aged man with a history of crushing chest pain and an ECG showing an acute infarct clearly requires rapid admission for treatment, probably including thrombolysis. Similarly, an elderly lady who has fallen, is unable to weight-bear, and has a fractured neck of femur will require in-patient care and surgery.

However, difficult situations occur where the clinical situation is less clear cut. Suppose for example that the middle-aged man experienced 4–5mins of chest pain which was atypical, has a normal ECG and CXR, and is anxious to go home. Or the elderly lady has no apparent fracture on X-ray, but is still unable to weight-bear.

Have I obtained the appropriate information required to make this decision?

This will usually require a balance between availability, time, and appropriateness. In general, in A&E, simple investigations which will rapidly give the diagnosis, or appropriate clues to it, are all that are needed. These include ECGs, plain X-rays, and simple blood tests such as ABG, U&E, and FBC. Simple trolley-side investigations are often of even greater value, for example six estimations of blood glucose (BMG) and urinalysis. If further, more complicated investigation is needed, then referral either for in- or out-patient management by a specialist team is indicated.

Has the patient had appropriate treatment pending in-patient team's arrival?

The most common error here is to forget, or delay, the administration of analgesia. Every patient in pain must have that pain appropriately treated as soon as possible. A patient does not have to 'earn' analgesia and there is no situation in which analgesia should be delayed to allow further examination or investigation. Concern regarding masking of signs or symptoms, for example in a patient with an acute abdomen, is not only inhumane but incorrect. Put yourself in the patient's position—it is remarkable how doctors' attitudes to pain and acute conditions alter when they themselves have experienced the condition at first hand!

Provided that these three aspects have been covered, the patient should then be referred to the appropriate member of the in-patient specialist team (see opposite).

General approach

Referring and handing over

How to refer patients

Referral will usually be by telephone, and while this form of communication has merits, it can itself create problems. Give a clear, concise summary of the history, the investigations, and treatment that you have already undertaken. It is important to indicate that the patient is being referred. Indicate that the specialist needs to come and see the patient. It is not usually enough to get telephone advice alone from a specialist in relation to a patient's presentation, especially if the patient is going to be discharged. With ever increasing pressures on beds in most hospitals, in-patient teams can be reluctant to come and see patients and are often happier to give advice over the phone if this avoids admission. This is never acceptable. If, in your view, the patient requires to be admitted then clearly indicate this. If, for whatever reason, this is declined, do not get cross, rude, or aggressive, but contact a senior member of A&E medical staff, such as your registrar or consultant, and they can speak to the specialist team themselves.

At the time that the specialist team comes to see the patient, or the patient is admitted directly to a ward, the A&E notes should be complete, legible, with a list of the investigations that have already been performed and the results that are available, together with a summary of treatment already given and the response achieved. In an emergency, do not delay referral or treatment merely to complete the notes, but write proper notes at the earliest opportunity.

Handing patients over

Dangers of handing over Handing over a patient in the A&E department to a colleague because your shift has ended and you are going home is fraught with danger. It is all too easy for patients to be neglected or receive sub-optimal or delayed treatment in one's eagerness to finish the shift and leave the department for other, socially pressing activities. The safest approach is to complete, to the point of either discharge or referral to an in-patient team, examination of every patient that you are seeing at the end of a shift. Occasionally, however, this may not be possible (for example, if there is a delay in obtaining an X-ray). In these situations, hand over the patient carefully to the next incoming A&E doctor who is taking over (and keep nursing staff informed of this arrangement).

How to hand over The handover should include those aspects of history and examination that have already been performed and the results of any investigations as well as treatment undertaken. Written records on the patient must be signed and as complete as possible. They should note the time that the patient was handed over and the name of the doctor concerned. In the same way, when accepting a 'handed-over patient' at the start of a shift, you must equally be happy as to the events that have occurred beforehand. Finally, it is courteous (and may prevent embarrassing situations) to tell the patient that further care will be performed by another doctor.

Analgesia in specific situations

Children

Injured children are often more distressed by fear than by pain. Sensitive treatment, explanation, and reassurance are important, but give analgesia whenever necessary.

IV morphine is appropriate in severe injuries, but take particular care if there is a head injury, since sedation may occur.

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Femoral nerve block (p320) provides good analgesia for femoral fractures and is usually well tolerated.

Digital nerve block with bupivacaine (p310) is useful for painful finger injuries (especially crush injuries). Provide this before X-ray: when the child returns from X-ray the finger may then be cleaned and dressed painlessly.

IM morphine is sometimes helpful after small burns if there is pain and distress since it provides sedation as well as analgesia and acts more rapidly than oral drugs.

Entonox (p292) gives rapid analgesia without the need for an injection.

Oral analgesia is usually with paracetamol (p286), but if this is inadequate add ibuprofen (p288) or dihydrocodeine elixir.

- Ibuprofen dose: 20mg/kg daily in divided doses as ibuprofen suspension (Junifen, 100mg in 5mL) 1–2 yrs: 2.5mL; 3–7yrs: 5mL; 8–12yrs: 10mL all 3–4 times daily.
- Dihydrocodeine elixir dose: 0.5–1mg/kg po 4–6 hrly.

Children in severe pain may benefit from po morphine (as 'Oramorph' oral solution, p290). Although not yet in widespread use, there are encouraging reports of the value of intranasal diamorphine in children.

Acute abdominal pain

It is cruel and unnecessary to withhold analgesia from patients with acute abdominal pain. Adequate analgesia allows the patient to give a clearer history and often facilitates examination and diagnosis: tenderness and rigidity become more localized and masses more readily palpable. Good X-rays cannot be obtained if the patient is distressed and restless because of renal colic or a perforated ulcer.

Morphine by slow iv injection (p290) is appropriate in severe pain, unless this is due to renal or biliary colic, in which an NSAID (p288) or pethidine (p290) may be preferable.

Toothache

Toothache or pain after dental extractions can often be eased by aspirin, an NSAID, or paracetamol. Do not give opioids such as codeine or dihydrocodeine which may make the pain worse. Drainage of a dental abscess may be required to relieve toothache.

Analgesia and anaesthesia

Analgesia in specific situations

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Approach to abdominal pain

The first priority is to triage in order to identify those patients requiring resuscitation or urgent treatment. The need for resuscitation is usually apparent in patients with surgical emergencies who are suffering from hypovolaemic and/or septic shock. Less obvious, but equally important, is the early recognition of patients requiring urgent treatment with no clinical evidence of shock (most particularly, ruptured abdominal aortic aneurysm).

History

The pain Determine details of site, radiation, shift, character, timing, precipitating and relieving factors.

Vomiting Record anorexia, nausea, and vomiting. Ask about the nature of vomit (blood, bile, etc).

Bowel disturbance Enquire about recent change of bowel habit, particularly any bleeding.

Other symptoms Do not forget that abdominal pain may be due to urological, respiratory, cardiovascular, or gynaecological disorders.

Past history Determine the nature of previous surgery, preferably by obtaining old notes.

Examination

Vital signs Pulse, BP, respiratory rate, GCS, and T° may indicate the need for immediate intervention.

Abdomen Note distension and scars from previous surgery. Remember to check that the hernial orifices are intact. Palpate gently for areas of tenderness. It is unnecessary and unkind to attempt to elicit rebound tenderness—tenderness on percussion is ample evidence of peritonitis. Perform RV/RB examination.

General Look for evidence of dehydration and jaundice. Examine the respiratory and cardiovascular systems.

Investigations

The assessment of patients with abdominal pain in A&E is usually more dependent upon history and examination than upon sophisticated tests. However, the following investigations may prove useful:

- BMG—DKA may present with abdominal pain (p152–3).
- Urinalysis—abdominal pain may result from urinary tract stones or infection.
- Blood tests—consider the need for FBC, U&E, amylase, coagulation screen, and X-matching. Although FBC is frequently requested in patients presenting with abdominal pain, the awaited WCC rarely alters initial patient management.
- X-rays—in general, CXR is more useful than abdominal X-rays. There are specific indications for abdominal X-rays, including: suspicion of intestinal obstruction, GI perforation, urinary calculi.
- USS—reveals gallstones, free peritoneal fluid, urinary stones, aortic aneurysm.

Treatment

Prompt resuscitation and provision of analgesia are integral components of the management strategy of serious abdominal conditions. The previously held belief that analgesia should not be given in A&E, on the grounds that it renders accurate interpretation of subsequent examination impossible, is no longer subscribed to. The most appropriate form of analgesia is usually iv opioid.

Surgery

Approach to abdominal pain

It is often difficult to decide if admission is needed for a patient with abdominal pain. Adopt a low threshold for seeking senior help. In general, if doubt exists, refer to the surgeon, who may decide that it is prudent to admit the patient for observation and investigation.

Pitfalls

- steroids or obesity may render physical signs less obvious
- absence of fever does not exclude infection, especially in the very old, the very ill, and the immunosuppressed
- when severe abdominal pain is out of all proportion to the physical findings, consider mesenteric infarction, aortic rupture/dissection, acute pancreatitis
- splenic rupture may occur in patients with glandular fever after relatively trivial trauma.
- consider gynaecological causes of abdominal pain in any woman of child-bearing age
- WCC may be normal in established peritonitis/sepsis
- amylase may be normal in acute pancreatitis. Conversely, moderate amylase ↑ may occur in acute cholecystitis, perforated peptic ulcer, and mesenteric infarction.

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Acute appendicitis

This common cause of abdominal pain in all ages is particularly difficult to diagnose in the extremes of age and in pregnancy.

History

The classic presentation is of central colicky abdominal pain, followed by vomiting, then shift of the pain to the right iliac fossa. However, many presentations are atypical, with a variety of other symptoms (eg altered bowel habit, urinary frequency) partly depending upon the position of the tip of the inflamed appendix (retrocaecal 74%; pelvic 21%; paracaecal 2%; other 3%).

Examination

In the very early stages there may be very little abnormal to find; in the very late stages the patient may be moribund with septic shock and generalized peritonitis. Between these extremes, there may be a variety of findings, including ↑T°, tachycardia, distress, foetor oris. There is usually a degree of tenderness in the right iliac fossa (± peritonitis). Rovsing's sign (pain felt in the right iliac fossa on pressing over the left iliac fossa) may be present. PR examination may reveal tenderness high up to the right with inflammation of a pelvic appendix.

Investigations

The diagnosis of acute appendicitis is essentially based upon clinical findings, rather than upon sophisticated investigations. X-rays are not routinely indicated, but perform urinalysis and consider the need for a pregnancy test. Although ESR may reveal an ↑wcc, this is not invariable.

Differential diagnosis

Depending upon the presentation, the potential differential diagnosis is very wide (p518)—remember to consider urinary, chest, and gynaecological causes.

Treatment

- Obtain iv access and resuscitate if necessary. Even if not shocked, but there is evidence of dehydration, commence iv fluids.
- Give iv analgesia (opioid, p290) and iv antiemetic (eg metoclopramide 10mg).
- If acute appendicitis is likely, or even just possible, keep the patient fasted and refer to the surgeon. If appendicectomy is required, preoperative antibiotics will ↓ the risk of infective complications.

Appendix mass

Untreated, acute appendicitis may proceed to perforation with generalized peritonitis, or it may become 'walled off' to produce a localized right iliac fossa inflammatory mass. There are many causes of such a mass (see below). Refer to the surgeon for further investigation and management.

Causes of a right iliac fossa mass

- appendix mass
- caecal carcinoma
- Crohn's disease
- ovarian mass
- pelvic kidney
- enlarged gall-bladder
- ileocaecal TB
- iliac lymphadenitis
- psoas abscess
- retroperitoneal tumour
- actinomycosis
- common iliac artery aneurysm
- Spigelian hernia

Surgery

Acute appendicitis

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Abdominal pain in children

The approach to the initial assessment and management of children presenting with abdominal pain is similar in many ways to that in adults (p516–17). Remember that disease processes may progress with great rapidity in children; therefore adopt a low threshold for referring children with abdominal pain to the surgical team. Whilst many of the common causes of abdominal pain are the same in children as in adults (eg acute appendicitis—p520), be aware of causes that are typically paediatric (eg intussusception). Likewise, certain causes of intestinal obstruction are seen almost exclusively in children.

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Paediatric causes of intestinal obstruction

- congenital (eg oesophageal/duodenal atresia, Hirschsprung's disease)
- meconium ileus
- hypertrophic pyloric stenosis
- intussusception
- hernia (inguinal, umbilical)

Hypertrophic pyloric stenosis

Features

This condition is relatively common, typically presenting with effortless vomiting at between 2–10wks. It occurs more frequently in boys than girls and in first-born children. Vomiting becomes projectile in nature, with progressive dehydration and constipation. The vomit is not bile-stained. After vomiting, the baby appears hungry and keen to feed again. In advanced cases, there may be a profound hypochloraemic alkalosis.

Diagnosis

Look for visible peristalsis. Abdominal palpation confirms the diagnosis if an olive-sized lump is felt in the epigastrium (most prominent during a test feed). If the diagnosis is suspected, but not proven clinically, resuscitate (as below) and arrange USS.

Management

Insert an IV cannula and send blood for U&E, glucose, and FBC. Commence fluid resuscitation under senior guidance and refer to the surgeon—operative treatment needs to be delayed until dehydration and electrolyte abnormalities have been corrected (this may take >24h).

Intussusception

Typically affects children aged between 6 months and 3 yrs. The child may suddenly become distressed, roll up into a ball, and appear unwell. Vomiting may develop and the child may pass a 'redcurrant jelly' stool. These features, however, together with pyrexia and a palpable mass, are not invariably present. X-rays may be normal or reveal an absent caecal shadow.

If intussusception is suspected, refer urgently to the surgical team. The diagnosis may be confirmed by air or barium enema, which may also be curative by reducing the intussusception.

Acute appendicitis (see p520)

Consider this diagnosis in any child presenting with abdominal pain. Acute appendicitis can occur in children of all ages. It can be a difficult diagnosis to make, especially in the very young.

Paediatric emergencies

Abdominal pain in children

Abdominal mass

There are many causes of abdominal masses in children, many of which may be relatively benign and asymptomatic:

- full bladder
- full colon
- enlarged liver and/or spleen
- pregnancy in older children
- hydronephrosis
- hypertrophic pyloric stenosis (see opposite)
- appendix mass
- intussusception
- neuroblastoma
- nephroblastoma (Wilm's tumour)

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Intra-abdominal malignancy

Neuroblastoma and nephroblastoma may reach a large size before causing symptoms (eg haemorrhage into the tumour).

Neuroblastomas arise most commonly from the adrenal glands, but may also occur at any point along the sympathetic chain.

Nephroblastomas (Wilm's tumours) arise from the kidneys and may present with haematuria.

All patients with suspected malignant abdominal masses require CT scan and USS investigation—refer urgently to the surgical team.

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Acute appendicitis

The most common surgical emergency (lifetime incidence: 6%).

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Pathogenesis Gut organisms invade the appendix wall after luminal obstruction by lymphoid hyperplasia, faecolith, or filarial worms—there may be impaired ability to prevent invasion, brought about by improved hygiene (so less exposure to gut pathogens). This 'hygiene hypothesis' explains the rise in appendicitis rates in the early 1900s and its later decline (as pathogen exposure dwindles further).

Symptoms As inflammation begins, there is central abdominal colic. Once peritoneum becomes inflamed, the pain shifts to the right iliac fossa and becomes more constant. Anorexia is almost invariable but vomiting rarely prominent. Constipation is usual. Diarrhoea may occur.

Signs

Tachycardia	Lying still	Signs in the right iliac fossa
Fever 37.5–38.5°C	Foetor ± flushed	Tenderness, guarding (p4)
Furred tongue	Coughing hurts	Rebound tenderness (p5)
	Shallow breaths	PR painful on right

Special tests: Rovsing's sign (pain more in the RL than the UL when the UL is pressed). In women, do a vaginal examination: does she have salpingitis (+ve cervical excitation, *OHCS* p50)? If rapidly available, consider CT.

Variations in the clinical picture • The schoolboy with vague abdominal pain who will not eat his favourite food.

- The infant with diarrhoea and vomiting.
- The shocked, confused octogenarian who is not in pain.

Hints and pitfalls • Don't rely on tests (eg wcc; urinoscopy).

- If the child is anxious use his hand to press his belly.
- Do not ignore right-sided tenderness on rectal examination: it may be the only sign of an inflamed retrocaecal appendix.

► Expect your diagnosis (both of 'appendicitis' and 'not appendicitis') to be wrong half the time. This means that those who seem not to have appendicitis should be re-examined often. Laparoscopy may be helpful.

Differential diagnosis

• Ectopic pregnancy	• Diverticulitis	• Perforated ulcer
• Mesenteric adenitis	• Salpingitis	• Cystitis
• Food poisoning	• Cholecystitis	• Crohn's disease

Treatment Prompt appendectomy. Metronidazole 1g/8h + cefuroxime 1.5g/8h, 3 doses iv starting 1h pre-op, reduces wound infections.

Complications Perforation with peritonitis with later infertility in girls (so have a lower threshold for surgery in girls); appendix mass (inflamed appendix surrounded by omentum); appendix abscess.

Treatment of an appendix mass There are 2 schools of thought: conservative and early surgery. Try the former initially—NBM and antibiotics (eg cefuroxime 1.5g/8h iv and metronidazole 500mg/8h iv). Mark out the size of the mass and proceed to surgery if it enlarges or the patient gets more toxic (pain↑; temperature↑; pulse↑; wcc↑). If the mass resolves it is usual to do an interval (ie delayed) appendectomy. Exclude a colonic tumour in the elderly.

Treatment of an appendix abscess Surgical drainage.

Appendicitis in pregnancy (1/2000 pregnancies) Pain and tenderness are higher due to displacement of the appendix by the uterus. Appendectomy is well tolerated but fetal mortality approaches 30% after perforation—so prompt assessment is vital.