Performing a digital rectal examination: considerations and interpretation

Introduction

The first part of this pair of articles discussed the main indications and provided a structured approach to performing the examination (https://doi.org/10.12968/hmed.2018.79.2.C18). This second part discusses the accuracy, main considerations and interpretation of the digital rectal examination. Although a useful clinical test, the digital rectal examination should be viewed in the context of the clinical presentation. As such, its accuracy is variable depending on the pathology. However, it can play an important role in the overall management of the patient and influence the subsequent course of treatment. There are also important considerations when performing the examination, notably in the assessment of children.

Accuracy of the rectal examination

Rectal cancer

The staging accuracy of digital rectal examination is not optimal and is limited to only cancers that are palpable. Several studies have reported varying staging accuracies ranging from 57.9 to 82.8% (Schaffzin and Wong, 2004). In primary care, digital rectal examination in patients with a palpable rectal tumour has a sensitivity of 76% and a specificity of 91% (Ang et al, 2008).

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However, digital rectal examination can provide important information about a rectal tumour such as the tumour location, mobility, morphology and the distance of the tumour from the anal sphincters. The latter is important in assessing whether a sphincter-saving procedure can be offered as treatment. It can also inform the clinician about the relationship of the tumour to surrounding structures such as the vagina or the prostate. Therefore, despite its suboptimal characteristics as a staging tool, digital rectal examination remains an important process in the initial evaluation of a rectal cancer.

Prostate cancer

The diagnostic pathway which aims to identify prostate cancer is based on two consecutive steps: digital rectal examination and measurement of serum prostate-specific antigen levels (Jacobsen et al, 1985; Smith et al, 1997). In the United States of America, more than half of men older than 50 years of age undergo regular screening for prostate cancer involving digital rectal examination (Edwards et al, 2005; Thompson et al, 2006). No such screening programme currently exists in the UK (NHS Choices, 2015).

The role of digital rectal examination in prostate cancer as a screening test remains controversial as a suspicion of cancer will lead to an invasive transrectal biopsy of the prostate gland. Several studies report varying accuracies in identifying prostate cancer. Flanigan et al (1994) report that in just over 1000 prostate quadrants that were suspicious on digital rectal examination, only 11% had cancer. However, in another study, digital rectal examination had accuracy, sensitivity and specificity rates of 79.9%, 91% and 73.8% respectively (Akdas et al, 1995). Furthermore, Aslan at al (2011) determined that digital rectal examination detected significantly more cancers with rising prostate-specific antigen levels. Both these studies suggest that despite its limitations as a screening test, digital rectal examination remains a major tool in the diagnosis of prostate cancer.

Anal fissure

Chronic anal fissures are usually associated with internal sphincter spasm or hypertonia, which is thought to impair fissure healing (Brodie, 1995; Corby et al, 1997). However, there is a proportion which may be associated with normal or low resting pressures and therefore be resistant to pharmacological intervention or be at risk of surgical intervention aimed at reducing sphincter pressure. Jones et al (2005) examined the ability of colorectal specialists to clinically detect, via digital rectal examination, low or normal pressure systems compared to anal manometry. Clinical assessment correctly identified 93% of those patients with high manometric tone whereas only 16% of patients with low or normal resting pressures were identified. Therefore, digital rectal examination has a limited role in distinguishing fissures with high or normal/low resting tone. The authors suggest treating all patients medically and then selectively investigating with anal manometry before considering surgical intervention.

Acute abdominal pain and appendicitis

The traditional teaching that digital rectal examination should be routinely be performed in all adult patients with abdominal pain and suspected appendicitis is supported in a number of surgical texts (Silen, 2010; Klingensmith et al, 2011). However, this has come under increasing scrutiny. Quaas et al (2009) found that digital rectal examination altered management in only 7% of patients seen in the emergency department with abdominal pain. Similarly, digital rectal examination did not change management in a series of 100 patients nor reveal any related pathology (Manimaran and Galland, 2004).

The indication for performing a rectal examination in suspected cases of appendicitis is based on the difficulty in diagnosing the condition in some cases and that the clinical presentation overlaps other conditions. If the appendix hangs into the pelvis, abdominal signs may be absent and the diagnosis may be missed. However, Bonello and Abrams

(1979) demonstrated a low sensitivity and specificity for digital rectal examination in predicting appendicitis. In addition, digital rectal examination was only positive in 38% of patients with appendiceal perforation. A more recent systematic review and meta-analysis examined the diagnostic performance of digital rectal examination for diagnosing acute appendicitis. In 19 studies, the pooled sensitivity and specificity was 49% and 61% respectively. The authors' conclusion was that acute appendicitis could not be ruled in or out through the result of digital rectal examination (Takada et al, 2015).

Given the poor diagnostic potential of digital rectal examination in the context of both acute abdominal pain and suspected appendicitis, the traditional teaching that digital rectal examination should always be performed needs to be reconsidered.

Cauda equina syndrome

Cauda equina syndrome represents a constellation of signs and symptoms resulting from compression of lumbosacral nerve roots. Traditional teaching dictates that digital rectal examination is used to assess the anal tone of patients with suspected caudal equina syndrome – a reduction in anal tone indicating that further imaging is necessary. However, its accuracy is debated.

In one retrospective study involving patients with confirmed caudal equina syndrome on magnetic resonance imaging, digital rectal examination did not significantly predict the outcome of the magnetic resonance imaging (P=0.897)(Gooding et al, 2013). Another study aimed to evaluate the ability of clinicians to assess anal tone using a simulated model anus connected to a pressure transducer, mimicking 'reduced' or 'normal' anal tones. Average accuracy in assessing anal tone was 64%, leading the authors to suggest that digital rectal examination for assessment of anal tone is not a wholly accurate tool (Sherlock et al, 2015).

Trauma and spinal cord injury

Traditional Advanced Trauma Life Support teaching was that digital rectal examination was mandatory in trauma patients. This is no longer the case. The current edition of Advanced Trauma Life Support (2012) states that 'digital rectal examination may be performed before placing a urinary catheter' and 'if a rectal examination is required, the clinician should assess for…:

> **"...digital rectal examination findings are often unreliable when diagnosing a spinal cord injury. The presence of a normal anal tone does not exclude spinal cord injury."**

- Rectal haemorrhage as a sign of intestinal injury
- Rectal mucosal injury or wall defects as a sign of rectal injury
- Loss of anal tone as a sign of spinal cord injury
- Palpable bony fragments as a sign of pelvic fracture
- A high riding prostate as a sign of urethral disruption.'

However, Shlamovitz et al (2007) found high rates of falsely negative digital rectal examinations:

- 94% for the presence of rectal blood
- 67% for disruption of the rectal wall
- 100% for the palpation of bony fragments
- 80% for an abnormally-positioned prostate.

In a similar study, Porter and Ursic (2001) found that the rectal examination influenced therapeutic decision making in just 1.2% of cases. They suggest that digital rectal examination is unlikely to affect initial management when applied indiscriminately to all trauma patients during the secondary survey. It may have a higher probability of influencing management in patients with penetrating injuries in proximity to the lower gastrointestinal tract, severe pelvic fractures or open fractures in continuity with the rectal vault.

On a similar theme, digital rectal examination findings are often unreliable when diagnosing a spinal cord injury. The presence of a normal anal tone does not exclude spinal cord injury. Shlamovitz et al (2007) found that digital rectal examination was only 37% sensitive.

Special considerations

Rectal examination in children

Jesudason and Walker (1999) argue that rectal examination in children should be considered as a specialist investigation and only be performed in certain scenarios. They compare it to an ideal investigation, which should be safe, easy to learn and perform, cheap, non-invasive, reliable and contribute to useful information. While it may be considered safe, cheap and easy to learn, it is certainly invasive and can be traumatic for the child concerned. They suggest that the rectal examination may irreparably damage the bond of trust and cooperation that is central to the assessment and management of a child. Dickson and MacKinlay (1985) classified the discomfort experienced as severe (major crying or screaming) or mild (minor crying or facial grimacing). In a series of 328 patients in which a rectal examination was attempted, it proved impossible on five occasions, caused severe discomfort in 24% of cases and mild discomfort in 37% of cases.

The same authors also argue that digital rectal examination yields limited useful information. Only 59% of patients with histologically confirmed appendicitis demonstrated a 'positive' finding (tenderness or swelling). Furthermore, in children without appendicitis (operated and non-operated), 12 of 98 patients had rectal tenderness. Overall, digital rectal examination altered the management in only two cases. They suggest that the interpretation of tenderness caused by the appendicitis may be questionable given the discomfort associated with rectal examination. Similar results were seen in a retrospective study of children under 12 years of age – 45% of patients with appendicitis had a negative rectal examination and two patients who did not have appendicitis had a positive examination (Bonello and Abrams, 1979).

Numerous studies address the role of digital rectal examination in rectal bleeding. In one study of minor rectal bleeding in children less than 14 years old, rectal polyps were discovered at sigmoidoscopy under anaesthesia in 53% of cases, but of these, 34% of cases were not identified by rectal examination alone (Balkan et al, 1998). In a series of children with colonic polyps (mean age 77 months), these were palpable on rectal examination in only 21% of patients (Pillai and Tolia, 1998). With rectal bleeding caused by suspected intussusception, Harrington et al (1998) identified a positive predictive value of 93% for a triad of clinical signs: vomiting, intermittent abdominal pain and right upper quadrant pain. Rectal examination did not alter management. Furthermore, ultrasound has a sensitivity and specificity of over 95% in diagnosing intussusception and therefore a rectal examination is unnecessary.

In trauma, Advanced Paediatric Life Support (Samuels and Wieteska, 2012) recommends that a rectal examination should be only carried out by an experienced surgeon caring for the child and only if the result will alter management.

Indications for rectal examination in children

Rectal examination should only be performed on the clear instruction of and by a senior clinician, and only if the results will alter management. This also has the advantage of ensuring that only the appropriate information is derived from the test, errors are avoided and unnecessary repetition is avoided.

However, as the literature suggests, there should only be very limited circumstances in which digital rectal examination is needed. In the authors' experience and practice, assessment of the child with abdominal pain takes place without rectal examination and in equivocal cases, observation on the ward occurs. Further uncertainty may warrant the use of imaging such as ultrasound. Such an approach avoids unnecessary surgical intervention and the need for a routine rectal examination.

In the case of rectal bleeding, rectal examination of the conscious child is rarely indicated. As the literature suggests, these patients should undergo examination under anaesthesia with sigmoidoscopy. In cases of suspected intussusception, a diagnosis should be made on clinical assessment and ultrasound alone.

Digital rectal examination and the immunocompromised

The frequency of bacteraemia following lower gastrointestinal manipulation varies in different reports. Sigmoidoscopy-associated bacteraemia rates vary from 0–9.5% (LeFrock et al, 1973; Everett and Hirschmann, 1977), colonoscopy rates from 0–5.6% (Norfleet et al, 1976; Everett and Hirschmann, 1977) and the rate associated with barium enema has been reported to be from 11.4–40% (Le Frock et al, 1975; Everett and Hirschmann, 1977). However, there is evidence to suggest that digital rectal examination has no effect on bacterial translocation – when a single examiner performed digital rectal examination on 50 men, there were no positive blood cultures (Tandberg and Reed, 1978). In another study involving 54 patients with leukaemia and acute rectal pathology, only in four cases did the clinical course suggest that digital examination or instrumentation of the rectum may have caused bacteraemia (Boddie and Bines, 1986). In light of this, the authors suggest that the rectal examination should not be neglected in immunocompromised patients, but should be left to those with experience to avoid unnecessary repetition of the examination.

Table 1. Common rectal pathology

Condition	Description
Haemorrhoids	■ Enlarged vascular cushions in lower rectum and anal canal ■ Can be asymptomatic or present with rectal bleeding (*Figure 1*) ■ First degree: remain in rectum; second degree: prolapse on defaecation but reduce spontaneously; third degree (*Figure 2*): prolapse, but require manual reduction
Peri-anal haematoma	■ Thrombosis within inferior venous plexus ■ Acute onset pain ■ Tense, smooth blue lump at anal margin
Anal fissure (*Figure 3*)	■ Tear at anal margin as a result of passage of constipated stool ■ Multiple fissures may be caused by Crohn's disease ■ Clinical features: anal pain (severe on defaecation), rectal bleeding
Anal warts (*Figure 4*)	■ Caused by human papillomavirus ■ Symptoms: bleeding, itching ■ Can recur ■ Usually venereal
Anal cancer (*Figure 5*)	■ Squamous cell carcinoma most common ■ Adenocarcinoma occurs in upper anal canal. May spread across dentate line and appear at anal margin ■ Clinical features: bleeding, itching, discharge, pain. Irregular hard mass
Anal fistula	■ Abnormal communication between internal opening in anal canal and external opening in peri-anal skin ■ Causes: anorectal abscesses, Crohn's disease ■ Clinical features: drainage of pus, blood, mucus or faecal matter (*Figure 6*)
Peri-anal abscess	■ Resulting from infection of hair follicle, sebaceous gland or peri-anal haematoma ■ Requires surgical drainage

Figure 1. Thrombosed haemorrhoid.

Figure 2. Third degree haemorrhoid.

Abnormal findings

A comprehensive discussion of all the possible abnormal findings found on digital rectal examination is beyond the scope of the article, but *Table 1* highlights some of the most common pathology that may be found on rectal examination in a typical general surgical clinic or on-call.

Figure 3. Anal fissure.

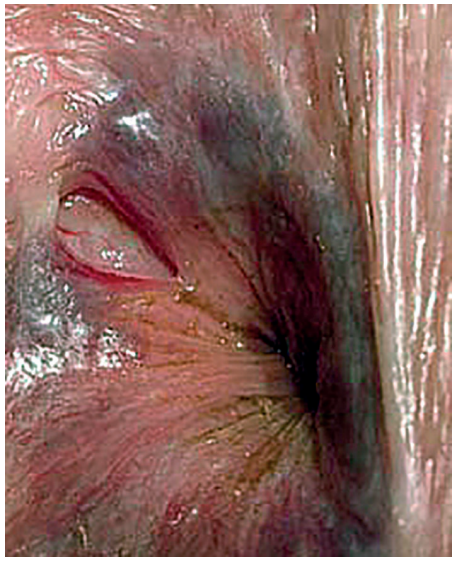

Figure 4. Anal warts.

Conclusions

Digital rectal examination is a valuable adjunct to the examination of a number of organ systems. Combined with an appropriate history, it can seal the diagnosis and direct treatment or further investigation. A structured approach is essential together with an adequate knowledge of its indications and limitations. **BJHM**

Conflict of interest: none.

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Figure 5. Anal cancer

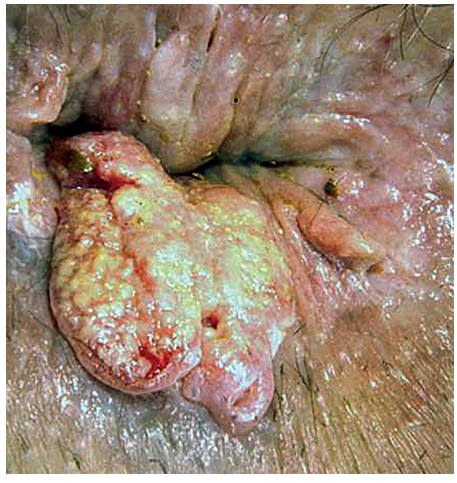

Figure 6. Anal fistula.

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KEY POINTS

- Rectal examination in children is rarely indicated and should only be performed on the instruction of and by a senior clinician.
- Rectal examination should not be neglected in immunocompromised patients if indicated.
- Common pathology found on rectal examination includes haemorrhoids, peri-anal haematomas, anal fissures, anal warts, anal cancer, fistulae and peri-anal abscesses.

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