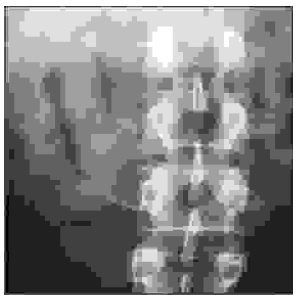
ORIGINAL PROF-1205

PLAIN ABDOMINAL RADIOGRAPHS AND ACUTE ABDOMINAL PAIN



DR. ABDOLALI ASSARIAN, MD, MRCSEd
Specialist Registrar,
Department of Surgery,
St Helier Hospital, UK

DR. AHSAN ZAFAR ZAIDI, MBBS, FRCS
Consultant Surgeon,
Department of Surgery,
St Helier Hospital, UK

DR. RAYMOND CHUNG, MBBS, B.Sc
Senior House Officer,
Department of Surgery,
St Helier Hospital, UK

ABSTRACT... aliassarian@yahoo.com In this study we audited one district general hospital's current practice of performing abdominal X-ray (AXR) in adult patients with acute abdominal pain. Data was collected from patients' notes one day post-admission and a total of 100 consecutive cases were reviewed in a two month period. AXR were deemed unnecessary in 53% of these in view of the patients' clinical presentation. Inappropriate use of AXR is a source of preventable radiation, patient discomfort and also an aspect of financial burden on the NHS. By educating staff, introducing an A&E poster and departmental protocol, the use of AXR can be restricted to necessary cases only.

Key words: Abdominal radiography, acute abdominal pain, audit, abdominal X-ray.

INTRODUCTION

The abdominal X-ray (AXR) was initially advocated as a routine investigation in all patients presenting with abdominal pain[1]. Since then, a number of studies have highlighted the inadequacies of AXR as an investigation for a majority of acute abdominal pain syndromes due to its low sensitivity and specificity[2-7]. Prasannan et al further illustrated that abdominal x-ray rarely influence management of patients presenting with acute abdominal pain without coexisting bowel obstruction. Some authors have suggested criteria for its appropriate use[2,4] and guidelines have been published by the Royal College of Radiologists (RCR)[9]. In doing so, the number of unnecessary examinations can ideally be minimised whilst maximizing the diagnostic yield.

Anyanwu et al[7] illustrated a possible reduction of abdominal x-ray use from 55.8% to 20.5% if specific criteria were used. Other than suspected cases of bowel obstruction, exacerbation of colitis and trauma, there is little justification for performing abdominal x-ray for diagnosis of abdominal pain. Bohner et al[10] further illustrated the ability to reduce the number of plain abdominal films necessary for patients with acute abdominal pain and suspected bowel obstruction by simple history and physical examination. As plain

abdominal radiography appears to remain within the management algorithm of all patients presenting with acute abdominal pain, this audit aimed to compare our current practice of performing abdominal x-ray with suggested guidelines and criteria.

PATIENTS AND METHODS

All adult patients with acute abdominal pain admitted to surgical wards in a district general hospital from October to December 2004 were included in the study.

Exclusion criteria included: age < 16 years, history of chronic abdominal pain, renal colic, chronic pancreatitis, known gallstones and trauma. Initial assessment and management, including the decision to refer for an abdominal x-ray, was mostly performed by a senior house officer. Data collected one day post admission included patients' clinical presentation, physical examination, blood results, probable diagnosis (impression of admitting doctor) and lastly, if X-rays had been ordered. The criteria used in deciding the appropriateness of abdominal x-ray as an investigation in each patient was determined by referring to the Royal College of Radiologists guidelines (Table I) and supported by recommendations concluded by large clinical studies[2-5] (Table II).

Table-I. RCR guidelines for performing abdominal x-ray in acute abdomen

In acute abdominal pain	
AXR is indicated in:	**AXR is not indicated in:**
Bowel obstruction	Appendicitis
Perforation	Biliary disease
Exacerbation of colitis	Pancreatitis
Peritonitis	Abdominal mass
-	Constipation
-	Gynaecology cases
-	Urinary tract infection

Table-II. Our audit reference criteria for doing abdominal x-ray in acute abdomen

Appropriate	Inappropriate
Bowel obstruction	Appendicitis
Bowel perforation	Biliary disease
Exacerbation of colitis	Pancreatitis
Peritonitis	Uncomplicated diverticulitis
-	Abdominal mass
-	Constipation
-	Gynaecology cases
-	Non specific abdominal pain

RESULTS

During the audit period, exactly 100 adult patients admitted to the surgical wards fulfilled the inclusion criteria. Out of these an abdominal x-ray was performed in 73 patients. When compared to the recommended guidelines, of those admitted and sent for abdominal x-ray, 53% were considered inappropriate. Table III highlights the primary clinical diagnoses on admission for patients who were inappropriately investigated; most common being appendicitis.

Table-III. Table illustrating the diagnoses of those inappropriately radiographed

Initial diagnosis	No. %age of pts
Appendicitis	12(30.7%)
Acute pancreatitis	8(20.5%)
Diverticulitis	6(15.3%
Cholecystitis	4(10.2%)
Biliary colic	3(7.6%)
Retained stone	2(5.1%)
Bowel pathology	1(2.5%)
Pulmonary embolism	1(2.5%)
Cholangitis	1(2.5%)
Food poisoning	1(2.5%)

Other points highlighting the inappropriate use of radiological investigation include: (i) a seven year old child admitted with likely appendicitis had two abdominal x-ray because the first film was of insufficient quality; (ii) four unsuitably investigated adult patients were subject to two abdominal x-ray due to the large size of their abdomen; and (iii) 28 out of 39 patients who had unnecessary abdominal x-ray were subject to a chest x-ray in the absence of appropriate indication.

Within the same audit period, 565 adults presented with abdominal pain (excluding renal colic) were discharged home directly from A & E, of which, 30% had an abdominal x-ray. If we assume that these patients did not present clinically with severe abdominal pain or bowel obstruction (as otherwise they should have been admitted regardless of x-ray findings) then those patients (188 cases) had unnecessary x-rays.

DISCUSSION

Medical X-rays are undeniably the largest idiopathic source of ionizing radiation experienced by the public[11]. This is increased as multiple views are obtained. In contrast, an abdominal x-ray exposes a subject to 50 times more radiation than a chest x-ray[9]. As there is no safe radiation dose, possibly the cause of genetic mutation and hence cancer, the Royal College of Radiology stresses the need to avoid unnecessary exposure of patients to radiation. The College also recommend that no investigation should be requested unless it can be justified clinically and its results are likely to influence management.

Abdominal x-ray is rarely beneficial in suspected appendicitis[12] and non-specific abdominal pain in which the inconsistent radiographs outnumber the helpful radiographs at a ratio of 3:2. In addition, the high "false positive rate" due to incidental and hence potentially misleading findings renders abdominal radiographs unsuitable for certain initial suspected diagnoses[4]. According to the RCR guidelines[9] radiographs are not indicated in cases of suspected biliary disease or pancreatitis (ultrasound is the initial investigation of choice).

In uncomplicated diverticulitis the findings are mostly non-specific and include ileus. Eisenberg et al[2] concluded from their study that 54% of radiographs could have been avoided without missing any grave irregularities if radiographs had been constrained to those with moderate/severe tenderness, suspected intestinal obstruction, renal colic, trauma, ischaemia, or gallbladder disease. Despite this, 39% of our patients in these groups were subject to an abdominal x-ray. As the chest X-ray is the accepted standard investigation for detection of free intra-peritoneal gas[13], some clinicians even question the role of AXR in generalised peritonitis (findings are mostly ileus).

Overuse of abdominal x-ray in our hospital suggests that it may currently be used as a routine component of the A&E work-up despite its observed limitations[14-16]. Doctors in training have been shown to be the main contributors to the overuse of abdominal radiography[16]. This practice should be discouraged as abdominal x-ray is not a sensitive screening tool and a normal film can only affirm that the diagnosis of intestinal obstruction is very unlikely. Goldberg[17] warns that the risk of being misled or forced to pursue another diagnostic pathway exists with any inappropriately requested investigation[17].

We suspect that the main reason for this wrong practice is lack of departmental protocol. Referrals for AXR in one hospital decreased from 31% to 7% after the introduction of posters displaying guidelines[18]. Furthermore, superfluous A&E abdominal x-ray could be avoided by senior surgical opinion[19]. From the results of this audit which is highlighted by other various studies, we suggest staff education, introduction of local protocols adopted from RCR guidelines, and the distribution of posters illustrating guidelines in A&E.

The excessive use of abdominal x-ray constitutes an unnecessary financial burden, increases patient discomfort, poses unnecessary radiation particularly gonadal, and may be a source of litigation. Compliance with the RCR guidelines virtually guarantees a successful defense against any claim for negligence on the grounds of under-investigation or excessive radiation[20].

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