



ASSESSMENT OF REFERRING CLINICIAN'S ADHERENCE TO ROYAL COLLEGE OF RADIOLOGISTS GUIDELINES FOR ABDOMINAL RADIOGRAPHY

Radio-Diagnosis

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ABSTRACT

Introduction: One of the commonest complaints encountered in the emergency department is acute abdominal pain and the most common investigation ordered to evaluate it is an abdominal X-ray (AXR). However many studies have shown that AXR has a low diagnostic yield and this investigation may be overused. So in order to optimize the sensitivity of AXR, the Royal College of Radiologists (RCR) introduced the iRefer guidelines. **Aims:** This study aims to assess referring clinicians' adherence to iRefer guidelines for abdominal radiography. And to determine whether the professional status of the referring clinician influences their adherence to the guideline. **Methodology:** This is a retrospective study of consecutive adult patients, who presented to a rural tertiary care center between October 2020 and March 2021. Indications for AXR and clinician seniority were determined from the radiology request slips. The appropriateness of imaging was determined by comparing the indication for abdominal radiographs to iRefer guidelines by the Royal College of Radiology. Data was then analyzed accordingly. **Results:** Our study included 100 patients. 22% of abdominal radiographs were requested according to the iRefer guidelines while 78% were against the guidelines (p-Value = 0.0001). Out of 22 radiographs adhering to iRefer Guidelines, 7 radiographs were normal and 15 were abnormal (14 correct and 1 incorrect in comparison to gold standard). Also, out of 78 radiographs not adhering to the guidelines, 59 radiographs were normal and 19 were abnormal (5 correct and 14 incorrect). **Conclusion:** The accuracy of detected abnormalities, if we adhere to iRefer guidelines, is 93%. Therefore, we need to follow the iRefer guidelines for every abdominal X-ray. Non-adherence to iRefer guidelines leads to unnecessary exposure of a patient to radiation and increased cost of treatment. To improve the patient's management we need to educate and inform the doctors of different levels about the guidelines.

KEYWORDS

Abdominal radiography (AXR); iRefer guidelines; Acute Abdomen; Emergency department; Diagnostic imaging; Intestinal obstruction; Inflammatory bowel disease.

INTRODUCTION:

Acute abdominal pain is a common presenting complaint for approximately 4-10% of patients visiting the emergency department (ED). (1-3) Despite of the low diagnostic yield and limited contribution to decision-making, abdominal X-ray (AXR) has traditionally been the first line of investigation for acute abdominal pain. (1, 3-5) There is still some evidence that an AXR may be a beneficial diagnostic tool for specific clinical indications such as suspected bowel obstruction (1, 3, 5) or ingested radio-opaque foreign body. (1, 5) However, indiscriminate referral for AXR should be discouraged (5) and the AXR should only be undertaken where the outcome will aid diagnosis, influence clinical management and increase diagnostic certainty. (2)

The iRefer guidelines, published by the Royal College of Radiologists (RCR) provide evidence-based guidance intended to assist referring clinicians to determine the most appropriate imaging investigation(s) for their patients and guarantee the benefits of imaging outweigh the risks of radiation exposure. (6) The AXR has a relatively high radiation exposure (approximately 0.7 mSv) when compared to 0.1 mSv with a chest X-ray and 10.0 mSv with computed tomography (CT) of the abdomen. Hence, referral for AXR should only be made when its findings are important in deciding the line of management. (7)

The Royal College of Radiologists has restricted the indications for abdominal X-rays to suspected bowel obstruction, constipation, palpable mass, acute exacerbation of inflammatory bowel disease, foreign body, acute, and chronic pancreatitis, or abdominal injury due to stabbing. (8)

However, studies have indicated that the clinician's compliance with iRefer guidelines is low (9, 10) with evidence suggesting that poor compliance reduces the diagnostic impact of the examination, resulting in delayed patient treatment and poor clinical outcomes. (1, 4, 9, 11) Inappropriate utilization of AXRs also incurs additional direct and indirect costs such as technician and radiologist time and delays in obtaining much-needed investigations. (9, 12)

Despite of the published evidence, a large volume of AXR referrals are received from the emergency department for patients with acute abdominal pain. Therefore, this study aims to assess referring clinicians' adherence to the Royal College of Radiologists guidelines

for abdominal radiography. And to determine whether the professional status of the referring clinicians influences their adherence to the guideline.

Methodology

This is a retrospective observational study conducted at B.K.L. Walawalkar Hospital, a rural tertiary care center. The study was conducted between 1st October 2020 and 15th March 2021. The study population included a total of 100 patients visiting the hospital's emergency department.

An initial search for patients who received an AXR in the emergency department was conducted in the hospital's database. Paper medical records for these patients were obtained and reviewed for patient details. The chart review was recorded onto a password-protected document.

Patients belonging to any age group and of either gender were included in the study. Patients who were referred from other hospitals after an AXR or those who were transferred to another hospital for further management were excluded from the study.

A standard data collection form was utilized for the systematic recording of the patient data. The primary data sources were ED doctors' clinical notes, discharge summaries (ED and ward), imaging request forms, and radiology reports. Radiology reports were obtained from printed records or the hospital's radiology information system if a paper record was unavailable.

If any further imaging was undertaken, the imaging modality and result of the investigation were recorded similarly.

RESULTS

This study included a total of 100 abdominal radiographs according to the inclusion and exclusion criteria. The most common indication in the study was abdominal pain (40%). A total of 22 abdominal radiographs were requested according to the iRefer guidelines while 78 were against the iRefer guidelines of RCR (p-Value = 0.0001).

Out 22 radiographs adhering to iRefer Guidelines 7 radiographs were normal and 15 were abnormal. Also, out of 78 radiographs not adhering to the iRefer guidelines 59 radiographs were normal and 19 were abnormal.

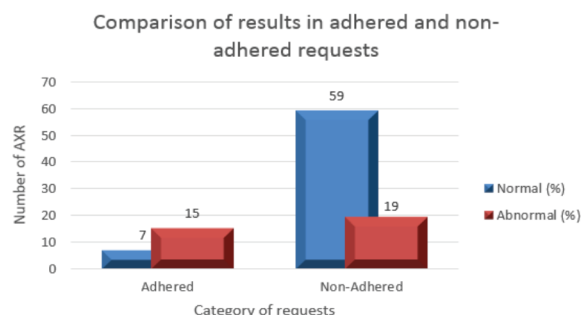


Figure 1: Comparison of results in adhered and non-adhered requests.

Out of the 15 abnormal radiographs from the adhered group 14 radiographs were correct and only 1 was incorrect when compared to the gold standard investigation such as ultrasonography (USG), Computed Tomography (CT), Intraoperative Record e.t.c. (p-Value = 0.0001). Accuracy of correct detection in adhered group is 93%.

Out of 19 abnormal radiographs in the non-adhered group only 5 radiographs were correct and 14 radiographs were incorrect when compared to the gold standard investigation (p-Value = 0.0001). The accuracy of correct detection in the non-adhered group is 26%.

The adherence to iRefer guidelines is maximum by the faculty members, moderate in the resident group, and minimum by interns.

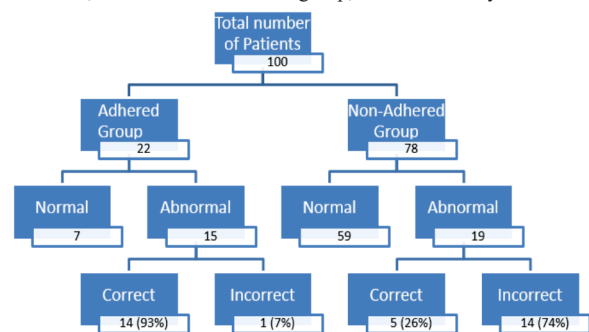


Figure 2: Study flow.

DISCUSSION

In our retrospective study of 100 patients with plain abdominal radiograph requests in a rural tertiary care center, only 22 radiograph requests were considered as 'Adhered' according to published iRefer guidelines. Overall, 66% had normal findings while 44% identified a pathology. Our findings confirmed the relatively low diagnostic yield of plain abdominal radiographs. (13)

According to Shreedharan et al. (2014), an AXR which is reported as normal does not reassure the clinician that no pathology is present. In their study, 41% of patients with a 'normal' AXR (n = 34/82) were referred for additional imaging with 18 of these (n = 18/34; 53.0%) having abnormal findings. They contributed the suboptimal referral pattern for both initial and follow-up imaging to be a result of poor clinician understanding of referral guidelines with only 16% (n = 3/19) of ED clinicians having awareness of the iRefer guidelines. (4)

Recent guidelines on the management of acute abdominal pain do not include AXR anywhere in their management strategy (1), nor is AXR deemed beneficial in suspected appendicitis, biliary colic, or acute pancreatitis (14).

Several other studies have shown that CT scan is more beneficial in both early diagnosis and minimizing mortality. (8, 15) This was true even in our study as a high proportion of patients required further imaging, the majority of which were CT scans. The benefits of CT lie in aiding the decision-making for management, planning for surgery, and possibly even avoidance of negative laparotomies.

Lameris et al. conducted a study in 2009 to identify an optimal imaging strategy for the accurate detection of urgent conditions in patients with acute abdominal pain. Though CT is the most sensitive imaging

investigation for detecting urgent conditions in patients with abdominal pain, they found that, using ultrasonography first and CT only in those cases with negative or inconclusive ultrasonography results in the best sensitivity. It also lowers the exposure of patients to radiation. This combination was more sensitive and specific compared to an AXR. (1, 2) In particular, an ultrasound may be more useful in determining pathology of biliary or gynecological origin. (12)

New radiological techniques, such as low-dose computed tomography (LDCT), yield more useful data while exposing patients to similar radiation doses as AXR. (16-19) In light of this, guidelines have been formulated to restrict the indications for AXR in EDs. The Australian Diagnostic Imaging Pathways (DIP) guidelines recommend that AXR be indicated only for suspected intestinal obstruction, perforation or foreign body and for following urinary stones. (20) The American College of Radiology (ACR) is more restrictive. Its guidelines consider that AXR is effective in cases of suspected foreign bodies and may be useful for following radiopaque urinary stones. (21) In all other indications, and particularly in cases of suspected obstruction, blunt abdominal trauma, and perforation, abdominal CT is deemed more appropriate than AXR.

CONCLUSION

The accuracy of detected abnormalities, if we adhere to iRefer guidelines, is 93%. Therefore, we need to follow the iRefer guidelines for every abdominal X-ray.

Adherence to such guidelines would produce multiple benefits such as

- (i) reduction of patient's radiation exposure,
- (ii) financial savings in the form of:
 - a. decreased number of radiographs performed;
 - b. decreased radiographer/radiologist time; and
 - c. reduced ancillary expenses such as pregnancy tests before AXR.

Poor clinician understanding of the referral guidelines leads to unjustified imaging requests and an inefficient service to patients. Therefore, to improve the patient's management we need to educate and inform the clinicians of different levels about these guidelines.

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