

USE OF ABDOMINAL X-RAY IN THE EMERGENCY DEPARTMENT



Government of South Australia
SA Health

Dr. Stuart McEwan

Central Adelaide Local Health Network

BACKGROUND

Between 80-100 abdominal x-rays (AXRs) are performed every month at the Queen Elizabeth Hospital Emergency Department, each the equivalent of 35 chest x-rays worth of radiation. After noting that a number of these requested did not fit within established guidelines, the aim was to improve the appropriateness and utility of AXR ordering through a departmental education programme.

METHOD

50 patients who had received AXRs were chosen at random during December 2018 and their AXR indication, result, compliance to guidelines (RANZCR [Figure. 1] and RCR UK [Figure. 2]) and further imaging was recorded. Education was delivered during departmental induction, in twice daily handover and posters were displayed throughout the ED [Figure. 3]. The second cycle was audited in May 2019 with an aim of 100% compliance to both sets of guidelines.

RESULTS

	December 2018	May 2019
Compliance with RANZCR pathway	77%	91%
Compliance with RCR UK	87%	96%
Abnormal result	23%	43%
Final diagnosis on AXR	12.5%	27.6%
Further imaging performed	46%	32%

77% of first cycle AXRs were reported without abnormality and 46% of patients had further imaging in department following their AXR. Of the 23% of abnormal AXRs, 55% of patients would receive a CT Scan. It was discovered that AXR alone confirmed the final diagnosis in only 12.5% of patients.

Following intervention, an increase in request compliance for both sets of referral guidelines was observed [Figure. 4].

There was a 20% increase in positive findings on AXR and a 14% drop in patients having further imaging.

35% of patients with an abnormal AXR went on to have a CT – a reduction of 20%.

In conclusion, the appropriateness and utility of our AXR ordering increased with departmental education on appropriate ordering using simple indications.

FIGURE. 1

RANZCR Western Australian AXR Guidelines

- Suspected bowel obstruction
- Suspected perforation
- Suspected foreign body
- Mod-severe undifferentiated abdominal pain
- Renal tract calculi follow-up

FIGURE. 2

RCR (UK) AXR iREFER Guidelines

- Clinical suspicion of obstruction
- Acute exacerbation of inflammatory bowel disease
- Palpable mass
- Constipation
- Acute and chronic pancreatitis
- Sharp/poisonous foreign body
- Smooth and small foreign body, e.g., coin, battery
- Blunt or stab abdominal injury

FIGURE. 3 - Educational Poster displayed on ED Monitors

Abdominal XR Audit

We have audited the Abdominal X-Rays performed in December and found the following:
 -25% of AXRs do not fit the RANZCR AXR Criteria (See below)
 -37.5% who had an AXR had further imaging in department; 29% of these had a CT
 -Only 23% of AXRs were positive for any form of pathology

RANZCR Western Australia indications for AXR

- Suspected bowel obstruction
- Suspected perforation
- Suspected foreign body
- Mod-severe undifferentiated abdo pain
- Renal tract calculi follow-up

One AXR exposes a patient to the equivalent of 35 posteroanterior CXRs and 37.5% of patients needed 2 AXRs to view their whole abdomen! Please stop inappropriately irradiating me!



We will be re-auditing the number of AXRs ordered and their requests throughout the next few weeks so think of the above when choosing to do an AXR!

FIGURE 4 – REQUEST QUERIES

	% 1 st Cycle Requests	% 2 nd Cycle Requests
Obstruction	68.75%	82.98%
Obstruction/Constipation	4.17%	0.00%
Volvulus	0.00%	2.13%
Constipation	6.25%	2.13%
Foreign Body	2.08%	6.38%
Unclear	4.17%	2.13%
Perforation	4.17%	2.13%
Colitis	6.25%	0.00%
Toxic Megacolon	0.00%	2.13%
Renal Calculi	2.08%	0.00%
Pulmonary Oedema	2.08%	0.00%

REFERENCES

- Smith JE, Hall EJ. The use of plain abdominal x rays in the emergency department. Emerg Med J. 2009;26(3):160-3
 Diagnostic Imaging Pathways: Indication for Abdominal Plain XRay - <http://www.imagingpathways.health.wa.gov.au>
 iRefer Guidelines, RCR Version 8.0.1 May 2017 <https://www.irefer.org.uk/guidelines>