

The Degree of Adherence to the Indications for Plain Abdominal Films in the Paediatric Emergency Unit of Basrah Hospitals – A Clinical Audit

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Abstract: The abdominal X-ray is often requested as a component of the diagnostic evaluation for abdominal problems within hospital settings. To mitigate unwarranted referrals, the implementation of guidelines has been undertaken, outlining suggested criteria for the use of abdominal X-rays. The present study included an evaluation of emergency physicians' adherence to referral criteria. Subsequently, an audit was conducted to examine the findings and provide a comprehensive analysis of the recommendations. Finally, a re-audit was performed to determine the extent of improvement in adherence to these guidelines. According to the fitness to the standard guidelines, the results showed that 75.4% of these referrals were fit to the guidelines prior to audit. After the audit, the fitness to follow guidelines equals 93.3% of the cases, which was significantly higher than the fitness to follow guidelines in the initial survey (P value = 0.007).

Index Terms: Abdominal X-ray, Children, Audit, Emergency, abdominal radiograph.

INTRODUCTION

Plain abdominal radiography (PAR) is one of the most common radiological examinations performed in emergency departments (EDs), but its utility may be questioned for a number of reasons. Firstly, of the standard radiography techniques, it delivers one of the highest radiation doses (0.7 mSv as opposed to 0.1 mSv for chest radiography). Secondly, the information it provides is often insufficient to guide the clinician in the management of the patient. Lastly, new radiological techniques, such as low dose computed tomography (CT), yield more useful data while exposing patients to similar radiation doses as PAR [1, 2].

The plain abdominal X-ray (0.7 mSv). Anecdotally, the AXR is overused and unhelpful in the majority of conditions presenting to the ED. In the past,

surgeons have requested an AXR as part of the routine workup of patients with undifferentiated abdominal in light of this, guidelines have been formulated to restrict the indications for PAR in EDs [3].

The British Royal College of Radiologists restricts the indications for PAR to exacerbation of inflammatory bowel disease and screening for foreign bodies, obstruction, or perforation. The abdomen radiograph is a commonly requested examination for paediatric patients. Children that present for abdominal x-rays are often very unwell; therefore, specialised techniques and appropriate communication are essential for gaining the child's cooperation [4].

This clinical audit aimed to assess and compare the current practice of pediatrics emergency department doctors in ordering plain abdominal X-ray with the standard approved practice. Also, to encourage the adherence of emergency doctors to the standard guidelines.

METHODS

This audit was conducted at the Radiology Departments and Paediatrics Emergency Unit of Al Basrah Maternity and Children Hospital in Basrah, southern Iraq. The time of initial data collection was from June 1 to June 6, 2022, and then a brief audit was presented on June 10, 2022. Later, we waited for 2 months from June 10th to August 10th, 2022, then started to re-audit from August 10th to August 16th, 2022.

We followed the national Iraqi Radiology Council guidelines, which are adopted from the Royal College of Radiologists (RCR) guidelines [5] for the use of plain abdominal radiography in the ED. Some modifications were adjusted by expert consultants'

radiologists and paediatricians to fit the paediatric ED. The indications include:

1. Acute abdominal pain warranting hospital admission and surgical consideration
2. Acute abdominal pain if perforation or obstruction suspected
3. Acute small or large bowel obstruction
4. Inflammatory bowel disease of the colon during acute exacerbation
5. Palpable mass
6. Constipation
7. Acute and chronic pancreatitis
8. Suspected ureteric colic/stones
9. A suspicion of Intussusception
10. A suspicion of Anal atresia
11. Clinical features suggestive of Necrotizing enterocolitis

The targeted subjects were the emergency department doctors, and the data was collected from the X-ray unit in the paediatric emergency department. We evaluated the referral or request letter, and we included 57 cases for the initial audit and 60 for the re-audit. The following variables were taken into account: age and gender of patients, the indication for referral (medical cause vs. surgical cause), and the exact referral complaint or cause. Also, the referring doctor (foundation year doctors, paediatric residents, and paediatric specialists) and whether the referral fits the guidelines or not.

The Statistical Package for Social Science (SPSS) version 26 software (Armonk, NY: IBM Corp.) was utilised to analyse the study's findings. The qualitative information was transcribed to a percentage and analysed with the Chi square test. A p-value of 0.05 or less is considered statistically significant.

RESULTS

In the first part of the audit, 57 cases were evaluated, whose ages ranged from one day to 13 years, including 28 females and 29 males. The indication for the referral to a plain abdominal X-ray was due to surgical causes in 64.9% of the cases and to medical causes in 35.1% of the cases (Table 1).

Table (1) : The details of the referrals in pre-audit state

Variable	No.	%	
Age	Range	1 day - 13 years	
Sex	Female	28	49.1
	Male	29	50.9
Indication of referral	Medical cause	20	35.1
	Surgical cause	37	64.9
Referring doctor	Foundation year resident	22	38.6
	Pediatric resident	22	38.6
	Pediatric specialist	13	22.8
The indication fit the guidelines	Fit	43	75.4
	Not fit	14	24.6
Total		57	100.0

According to the fitness to the standard guidelines, the results showed that 75.4% of these referrals were fit to the guidelines, and there was no significant difference between the fitness to refer and the level of referring doctor, whether foundation year, resident, or specialty doctor, in ordering a plain X-ray (P-value = 0.534), although the percentage of non-fitness was higher among the foundation year doctors (Table 2).

Table (2) : The association between fitness status and referring doctors in pre-audit state

Referring doctor	Fit the guideline		Not fit the guideline		p-value
	No.	%	No.	%	
Foundation year resident	15	34.9	7	50.0	0.534
Pediatric resident	17	39.5	5	35.7	
Pediatric specialist	11	25.6	2	14.3	
Total	43	100.0	14	100.0	

Additionally, there was a highly significant difference (P-value = 0.001) between the cause of the audit, whether medical or surgical, and the fitness for referral, as most of the causes that fit the guidelines (81.4%) were surgical causes (Table 3).

Table (3) : The association between fitness status and referral indication in pre-audit state

Indication of referral	Fit the guideline		Not fit the guideline		p-value
	No.	%	No.	%	
Medical cause	8	18.6	12	85.7	0.001
Surgical cause	35	81.4	2	14.3	
Total	43	100.0	14	100.0	

A re-audit was performed on 60 cases after two months, whose ages ranged from one day to 14 years, with 31 females and 29 males. Still, the surgical cause was the most common reason for

referral to a plain X-ray (63.3%). Interestingly, the fitness to follow guidelines equals 93.3% of the cases, which was significantly higher than the fitness to follow guidelines in the initial survey (P value = 0.007) (Tables 4 and 5).

Table (4) : The details of the referrals in pre-audit state

Variable		No.	%
Age	Range	1day -14 years	
Sex	Female	51.7	51.7
	Male	48.3	48.3
Indication of referral	Medical cause	36.7	36.7
	Surgical cause	63.3	63.3
Referring doctor	Foundation year resident	38.3	38.3
	Pediatric resident	40.0	40.0
	Pediatric specialist	21.7	21.7
The indication fit the guidelines	Fit	93.3	93.3
	Not fit	6.7	6.7
Total		100.0	100.0

Table (5) : The difference in fitness to guidelines in pre and post audit state

Timing	Fit the guideline		Not fit the guideline		P-value
	No.	%	No.	%	
Pre audit	43	46.2	14	58.3	0.007
Post audit	56	53.8	4	41.7	
Total	99	100.0	18	100.0	

Still, there was no significant difference between the level of the referring doctor and the fitness to follow guidelines (P value = 0.81), and there was also no significant difference between the causes of referral and the fitness to follow guidelines (P-value = 0.099) (Tables 6 and 7).

Table (6) : The association between fitness status and referring doctors in post-audit state

Referring doctor	Fit the guideline		Not fit the guideline		p-value
	No.	%	No.	%	
Foundation year resident	21	37.5	2	50.0	0.812
Paediatric resident	23	41.1	1	25.0	
Paediatric specialist	12	21.4	1	25.0	
Total	56	100.0	4	100.0	

Table (7) : The association between fitness status and referral indication in post-audit state

CONFLICTS OF INTEREST

Indication of referral	Fit the guideline		Not fit the guideline		p-value
	No.	%	No.	%	
Medical cause	19	33.9	3	75.0	0.099
Surgical cause	37	66.1	1	25.0	
Total	56	100.0	4	100.0	

DISCUSSION

The abdominal X-ray is often requested as a component of the diagnostic evaluation for abdominal problems within hospital settings. The initiation of the imaging workup often involves an abdominal X-ray [6]. The majority of patients who exhibit notable abnormalities in abdominal X-rays are subsequently recommended for further tests. In order to mitigate unwarranted referrals, the implementation of guidelines has been undertaken, outlining suggested criteria for the use of abdominal X-rays. The present study included an evaluation of emergency physicians' adherence to referral criteria. Subsequently, an audit was conducted to examine the findings and provide a comprehensive analysis of the recommendations. Finally, a re-audit was performed to determine the extent of improvement in adherence to these guidelines. While the majority of referrals for abdomen X-rays adhere to the established recommendations, the results of these X-rays indicate that the clinical indications and symptoms have poor predictive value for detecting abnormalities in abdominal X-rays. The survey findings indicate that the primary reasons for referrals are surgical in nature. This aligns with the results of a previous study conducted by Hassan et al., which examined abdominal X-ray requests in accordance with royal college guidelines. The study revealed a higher frequency of abdominal X-ray requests that adhered to these guidelines [4].

CONCLUSION AND RECOMMENDATIONS

The findings of this survey indicate a considerable improvement in adherence to the referral criteria after the audit. It is advisable to promote adherence among emergency medical practitioners to the established recommendations pertaining to the use of plain abdomen x-rays as a diagnostic tool. This measure has the potential to enhance patient safety while optimising resource allocation and minimising unnecessary financial burden.

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