

ORIGINAL ARTICLE

Diagnostic impact of emergency ultrasound of RUQ pain

Abdulaziz AlRabiah¹, Afnan Almass^{2*}, Noura Ahmed³, Torki AlNasser⁴,
Abdulaziz Islam⁵, Mohammed BinAskar⁶, Falwah Alharthi³

ABSTRACT

Background: Even though ultrasound is an excellent tool in medical diagnostics and evaluation, its lack of full automation can be a substantial downside. In this study, we evaluated the result of bedside ultrasound right upper quadrant (RUQ) pain by physicians in the emergency ward of King Saud University Medical City when compared to the review of the diagnosis by hospital radiologists.

Methods: By means of a questionnaire, data were collected from King Saud hospital patients who presented with RUQ pain suggesting biliary disease in the emergency department. The questionnaire was made available on-site and a notification was passed to all on-duty physicians per shift to fill it out after the initial investigation of RUQ pain and to place the printout in a collection box.

Results: Half of the initial diagnoses were cholelithiasis (53.6%), followed by cholecystitis (30.4%), and lastly cholangitis (3.4%), making the majority of suggested diagnoses related to the gall bladder. A review by the on-duty radiologist confirmed 55.2% of initial diagnoses and refuted 22.4%.

Conclusion: More RUQ ultrasound training is required among emergency physicians.

Keywords: RUQ, pain, ultrasound, sonogram, imaging.

Introduction

The emergency department is the initial port of call for patients with an acute medical illness (real or suspected) or any serious injury. The International Federation for Emergency Medicine defines Emergency Medicine as “A field of practice based on the knowledge and skills required for the prevention, diagnosis, and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of undifferentiated physical and behavioral disorders. It further encompasses an understanding of the development of pre-hospital and in-hospital emergency medical systems and the skills necessary for this development.” This is of such importance that in the United States, Emergency Medicine is seen as the foundation of the healthcare system [1].

Emergency physicians (EPs) are the first line of aid for patients, providing rapid assistance and triage for all patients, regardless of age group, gender differences, time of presentation, or financial status [1].

EPs have a clear understanding of the healthcare system and their patient's needs. They are trained to plan, evaluate, resuscitate, and manage a wide range of illnesses and limb or life-threatening conditions [2].

The modern emergency department is well equipped with multiple tools ranging from CT scanners to intravenous cannula to aid EPs in providing the best aid possible. Of these various tools, one of the most frequently used is the Point of Care Ultrasound [2,3]. Ultrasound has gained preference over other modalities owing to its accessibility, non-ionizing radiation, cost-efficacy, portability, and being non-invasive [2].

EPs typically use ultrasound in a more extended fashion due to its increased diagnostic ability [4]. These include abdominal, testicular, early obstetric, musculoskeletal, and ocular conditions [3]. Even in conditions where other methods have a higher specificity (94%) and sensitivity

Correspondence to: Afnan Almass

*Emergency Medicine Consultant, Department of Emergency Medicine, AdDiriyah Hospital, Ministry of Health, Riyadh, Saudi Arabia

Email: afnan.almass@hotmail.com

Full list of author information is available at the end of the article.

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(97%), such as cholecintigraphy for acute cholecystitis, ultrasound is the most commonly used method of diagnosis [5].

The point in which ultrasound may be seen to hold a large downside is in its operator-dependent application.

In this study, we attempted to evaluate EPs' utilization of bedside ultrasound to diagnose right upper quadrant (RUQ) pain in King Saud medical city and compare their assessments with the radiology physician's confirmation of the diagnosis.

Materials and Methods

This is an observational cross-sectional study. Data were collected in King Saud medical city's emergency department based in Riyadh, Saudi Arabia, between June 2018 and November 2018. The inclusion criteria were being over 14 years of age and presenting to the emergency department with RUQ pain.

A short-validated questionnaire was available in the emergency departments in clearly identified locations with a collection box nearby. The questionnaire consisted of four items: patient code, doctor position, most likely diagnosis, and ultrasound findings. We asked all doctors in each shift to fill out the validated questionnaire after the initial investigation of RUQ pain and to place the complete form in the collection box.

Later, questionnaires were collected, and the initial diagnosis was reviewed for accuracy by the radiology physician on shift.

Data were analyzed using Statistical Package for the Social Sciences and Microsoft Excel. Descriptive statistics and frequencies were used to present results.

Results

The majority of participants were interns (50%), followed by 2nd-year residents (22%), 1st-year residents (12%). Third and 4th-year residents had equal participation (4%), and finally consultants made up 1% of the participants (Table 1 and Figure 1).

Regarding the diagnosis, half of the initial diagnoses were cholelithiasis (53.6%). This was followed by cholecystitis (30.4%) and lastly cholangitis (3.4%), making the majority of suggested diagnoses gallbladder-related.

EP responses for details of the ultrasound scan, 69% described finding gallbladder shadows, claiming a most likely case of gallstones; however, only 23.5% evidenced clear imagery of these (Figure 2).

Once reviewed by a radiologist, 55.2% of the EP diagnoses were validated when comparing between POCUS and the comprehensive ultrasound results. It was found to be incorrect or inexact in 22.4% of the cases and the remaining were found to be lacking data to determine either way (Table 2).

Discussion

Acute abdominal pain is one of the most common complaints registered at the emergency department and is assessed by EPS on a daily basis; it can be a sign of a life-threatening disease or mild and treatable condition [1].

As an EP, procedures include having to stabilize the patients and attempting to determine a deferential diagnosis as fast as possible. However, RUQ pain is one of the most common complaints and characteristic of several different conditions that could be harmful to the patient if not correctly diagnosed [3]. To this end, the use of point of care ultrasound is favored as it is a fast tool in diagnosing and evaluating medical conditions; its operator-dependent feature can be a substantial downside. We found that EP diagnosis were correct in only 55.2% of the cases as confirmed by the radiologist, which is not encouraging.

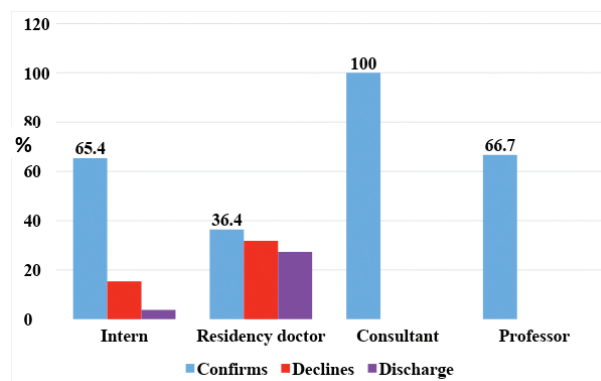


Figure 1. Physician position.

Table 1. Doctors' position.

Doctor position					
		Frequency	Percent	Valid percent	Cumulative percent
Valid	Intern	26	44.8	50.0	50.0
	Residents	22	37.9	42.3	92.3
	Consultant	1	1.7	1.9	94.2
	Professor	3	5.2	5.8	100.0
	Total	52	89.7	100.0	
Missing	System	6	10.3		
Total		58	100.0		

Ultrasound finding

56 responses

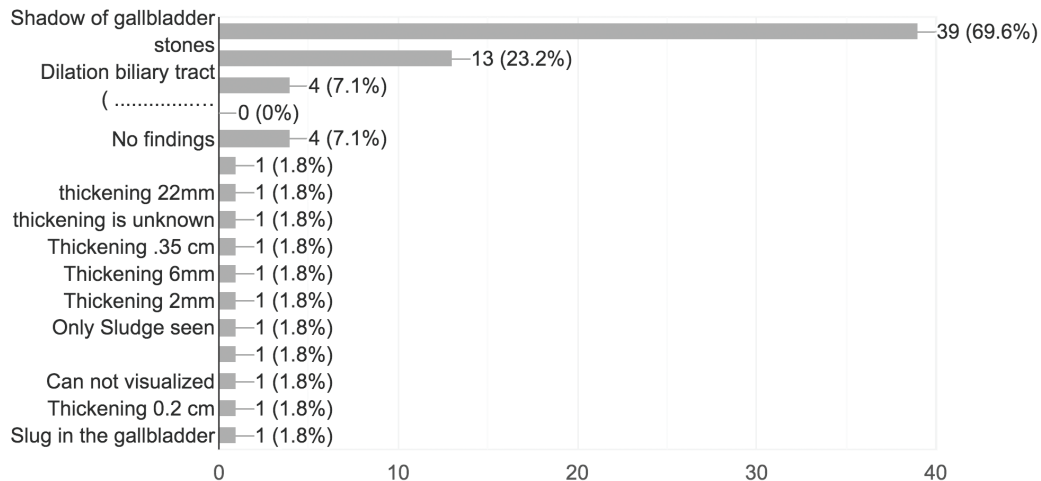


Figure 2. Ultrasound findings.

Table 2. Diagnostic accuracy between the emergency physician's results and the radiology physician's results.

Validity	Radiology report			
	Frequency	Percent	Valid percent	Cumulative percent
Confirms	32	55.2	55.2	55.2
Declines	13	22.4	22.4	77.6
Normal scan	7	12.1	12.1	89.7
No findings	1	1.7	1.7	91.4
Nothing	1	1.7	1.7	93.1
Missing cases (No information)	4	6.9	6.9	100.0
Total	58	100.0	100.0	

Limitation

As King Saud medical city is classified as a teaching hospital, interns have a significant role in the emergency department. Being still in training, it is expected for there to be a higher level of errors. This is taken into account in the hospitals policy to limit patient acceptance to non-urgent cases only.

Also, a total of 58 patients made up the entire sample size for testing, which is an insufficient number for broad conclusions. There was also considerable difficulty with staff forgetting to fill the questionnaire or a marked uncooperative behavior.

Conclusion/recommendations

In conclusion, we found that the most common initial diagnosis of RUQ in the ED of KKHU was cholelithiasis, followed by cholecystitis and cholangitis. Of these, only 55.2% were confirmed by the radiologist.

We recommend an online questionnaire targeted at ED residents and consultants to better train them in assessing ultrasound findings.

List of Abbreviations

RUQ Right Upper Quadrant
EPs Emergency Physicians

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

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Consent for publication

Written consent was obtained from all the participants.

Ethical approval

Ethical approval was granted by Institutional Review Board of King Saud University via reference letter number E18-3197 dated: 21 MAY 2018.

Author details

Abdulaziz AlRabiah¹, Afnan Almass², Noura Ahmed³, Torki AlNasser⁴, Abdulaziz Islam⁵, Mohammed BinAskar⁶, Falwah Alharthi³

1. Assistant Professor of Emergency Medicine, Department of Emergency Medicine, King Saud University, Riyadh, Saudi Arabia

2. Emergency Medicine Consultant, Department of Emergency Medicine, Addiriyah Hospital, Ministry of Health, Riyadh, Saudi Arabia
3. Emergency Medicine Resident, National Guard Hospital, Riyadh, Saudi Arabia
4. Medical Intern, King Saud University, Riyadh, Saudi Arabia
5. General Anesthesia Resident, Prince Sultan Military Hospital, Riyadh, Saudi Arabia
6. General Surgery Resident, Prince Sultan Military Hospital, Riyadh, Saudi Arabia

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