

EVALUATION OF ABDOMINAL X-RAYS AND ULTRASOUND AT GROOTE SCHUUR HOSPITAL



PRESENTATION LIST

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- Objectives
- Hypothesis
- Methodology
- Data collection and sample size
- Results
- Conclusion from results
- Possible impact on community

INTRODUCTION

- Abdominal X-Rays (A X R) and Ultrasound (US) are commonly used in evaluating patients with abdominal pathology.
- Anyawu(1998) claimed that A X R provide very little information only with patient presenting with obstruction are X-Rays valuable.
- This study was conducted at Groote Schuur Emergency Unit to determine if Ultrasound provide a faster final diagnosis than X-Rays for patients presenting with abdominal pathology.

AIM

The aim of the study is to assess the effectiveness of abdominal X-Rays and whether Abdominal Ultrasound is more effective in diagnosing abdominal pathology

DEFINITION OF ACUTE ABDOMEN

- ANY PATHOLOGICAL CONDITION OF THE ABDOMEN THAT THE PATIENT PRESENTS WITH, e.g. OBSTRUCTION, GALLSTONES, APPENDICITIS, ABDOMINAL PAIN, GYNEA PROBLEMS,

...

OBJECTIVES

- To determine if Ultrasound provide a better and faster diagnosing method for evaluating patients presenting with abdominal pathology.
- **To determine that ultrasound eliminate any additional test the patient had to undergo to obtain final diagnosis so as to minimize cost and decrease the stay of patient time in the hospital to stretched the hospital budget.**
- A final aim is to determine if radiation to patients can be minimized and radiation safety of the Radiographer can be improved.

HYPOTHESIS

- **Ha** Abdominal ultrasound provide a speedy diagnosis compared to Abdominal X-Rays with patients presenting with abdominal pathology, confirms the final diagnosis, eliminate extra examinations and speed up the treatment of the patient.
- **Ho** Abdominal Ultrasound does not provide a speedy diagnosis compared to abdominal X-rays with patients presenting with abdominal pathology, does not confirms the final diagnosis, does not eliminate extra examinations and doesn't speed up the treatment of the patient.

OBTAINING A DIAGNOSIS

- **When a patient present with an abdominal complain, the diagnosis can based on:**
 - The clinical evaluation of the medical practitioner
 - The diagnosis of an X-Ray for the patient
 - Both the clinical diagnosis and X-Ray of the patient
 - The Ultrasound diagnosis of the patient
 - Both the clinical diagnosis and Ultrasound of the patient
 - Any other diagnostic procedure requested by the doctor, example blood or urine test, CT or MRI.
 - Other methods to determine a diagnosis
 - **Both X-Rays and Ultrasound examination of the patient**

METHODOLOGY

- **Study Design:** Retrospective Study
- **Instrument of Measurement:** Data Capture Sheet
- **Study Setting:** Information was collected from patients folders presenting with abdomen pathology at GSH medical emergency department.
- **Target Population:** Adult patients with abdomen pathology at GSH medical emergency department who received both Abdominal X-Rays and Ultrasound within 7 days

METHODOLOGY (Cont)

- Sample Size: 22
- Age: Adults
- Systematic Randomly Selected
- Permission obtained from Chief Radiographer in Charge at GSH
- The Data Capture sheet was completed by the Researchers from the patients folders

EXPECTED RESULTS

- The expected results are that ultrasound is more suitable in evaluating patients with abdominal pathology and that the final diagnosis corresponds in most cases with the diagnosis on the ultrasound examination.

DATA COLLECTION

- Data was collected from patients folders onto a Data Capture Sheet
- The patients folders was evaluated by the researchers

DATA CAPTURE SHEET

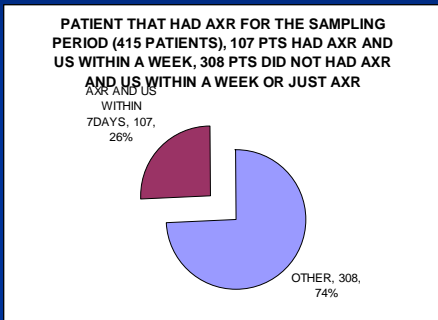
Pt. Nr	
Age	
Sex MF	
Race B/C/W/O	
Previous Abdominal Pathology [Code]	
Previous Lapotomy [Code]	
Referral Dr's Diagnosis [Code]	
CXR Requested	
CXR Done	
CXR Reported	
Diagnosis on CXR [Code]	
AXR Requested	
Diagnosis on AXR [Code]	
US Requested	
US Done By Ultrasonographer	
Diagnosis on US done by Ultrasonographer [Code]	
US Done By Radiologist	
US Reported by Radiologist	
Diagnosis on US done by Radiologist [Code]	
Lapotomy requested	
Lapotomy Done	
Diagnosis with Lapotomy [Code]	
Final Diagnosis [Code]	

DATA CAPTURE SHEET USED

- Shortened
- Data
- Capture Sheet
- Due to Time
- Limitation

GSH ULTRASOUND AND ABDOMINAL X-RAYS	
DATE: CAPTURED: Group 8	
Y - YES N - NO U - UNKNOWN	
D - DON'T KNOW	
Pt. Nr	
Date AXR	
Date US	
Age	
Sex MF	
Differential Diagnosis before A X R or US [Code]	
Diagnosis on AXR [Code]	
Diagnosis on US [Code]	
Final Diagnosis [Code]	

26% OF PTS THAT HAD AXR AND US WITHIN A WEEK. ALL PTS HAD AXR



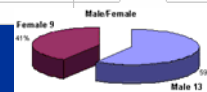
OBTAINING THE SAMPLE SIZE

- 415 Pts were screened who had A X R at GSH from 1 May 2006 until 31 July 2006
- 107 Pts had US and A X R within a week
- Sample Size (20% of May, June, July total) = 22
- 1st Pt was selected Randomly
- Every 5th Patient was selected for sampling
- 20% X 107 = 21.4 and 107/21.4=5 (every 5th patient)

SAMPLE SIZE

2006	Nr. of Patient	Nr. of Patients	Nr. Of Total (total)
January			
February			
March			
April			
May	155	39	
June	120	32	107 21.4 Patients
July	140	36	
August			
September			
October			
November			
December			

22 Patients Sampled



MALE/ FEMALE % AGREES WITH Chhetri RK (2005)
ACUTE ARDO AFFECT 2 X MALES THAN FEMALES

SAMPLE EVERY 5TH PATIENT

GSH ULTRASOUND AND ABDOMINAL X-RAYS DATE: 11/07/2006 CAPTURED: Group 8	
Pt. Nr	21
Date AXR	11/07/2006
Date US	11/07/2006
Age	41
Sex MF	F
Differential Diagnosis before A X R or US [Code]	Appendicitis Tube Ovarian Complex
Diagnosis on AXR [Code]	NAD
Diagnosis on US [Code]	NAD
Final Diagnosis [Code]	Tube Ovarian Complex

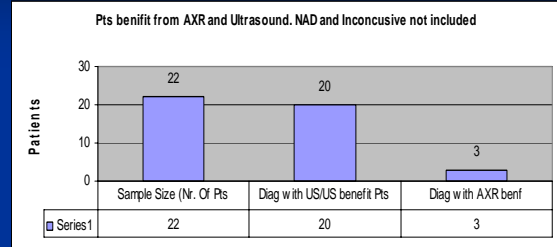
EXTRACTING INFORMATION FROM DATA OBTAINED

- A TOTAL OF 52 DEDUCTIONS WERE MADE FROM THE DATA EXTRACTED FROM THE 22 PATIENTS SAMPLES:

Examining the Results			
Description	No	% of Total	
1 Total number of patients	22	100%	
2 Male	13	59%	
3 Female	9	41%	
4 Mean Age	45		
5 No of patients with conclusive diagnosis on X-Ray	3	14%	
6 No of patients with inconclusive diagnosis on X-Ray	7	32%	
7 No of patients with conclusive diagnosis on Ultrasound	20	91%	
8 No of patients with inconclusive diagnosis on Ultrasound	1	5%	
9 No of patients with conclusive differential diagnosis before X-Ray and Ultrasound (The doctors know what they looking for)	22	100%	
10 No of patients with inconclusive differential diagnosis before X-Ray and Ultrasound (The doctors don't know/having difficulty what they looking for)	0	0%	
11 No of patients with conclusive final diagnosis	22	100%	
12 No of patients with inconclusive final	0	0%	

46	No of patients who underwent an Ultrasound examination after the X-Ray examination	17	77%
47	No of patients who underwent an Ultrasound examination one day after the X-Ray examination	9	41%
50	No of patients who underwent an Ultrasound examination more than one day after the X-Ray examination	8	36%
51	No of patient who underwent an Ultrasound examination within one day before or after the X-Ray examination	11	50%
52	No of patient who underwent an Ultrasound examination two or more days before or after the X-Ray examination	10	45%

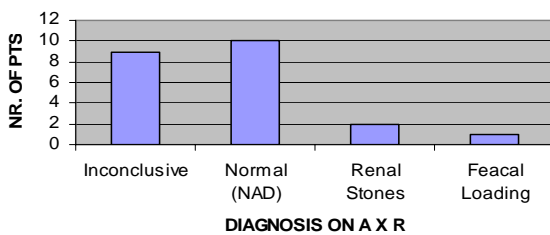
COMPARING A X R AND US DIAGNOSIS WITH FINAL DIAGNOSIS OF PATIENTS



AGREES WITH RESEARCH DONE BY (George R. 1984) INDICATING US HAS A ↑ SENCITIVITY THAN AXR

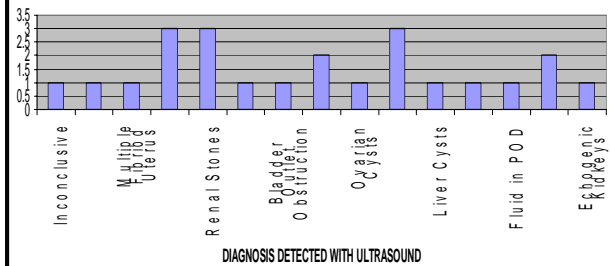
DIAGNOSIS OBTAINED WITH A X R

COMPARING THE DIAGNOSIS ON AX R FOR PATIENTS

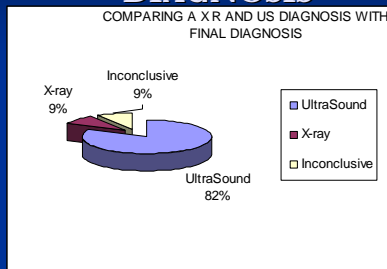


DIAGNOSIS OBTAINED WITH ULTRASOUND

COMPARING THE DIAGNOSIS ON US FOR PATIENTS



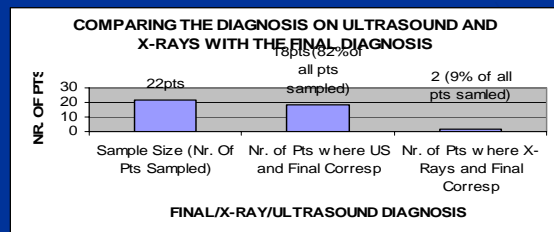
COMPARING A X R AND US DIAGNOSIS WITH FINAL DIAGNOSIS



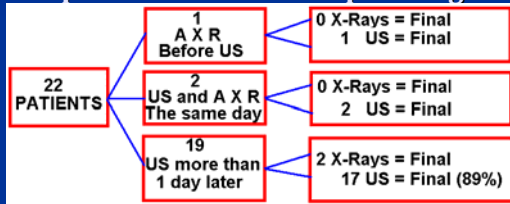
AGREES WITH RESEARCH DONE BY (George R. 1984) INDICATING THAT US HAS A 95% ACURACY WITH <50% FOR AXR

LOOKING AT OBJECTIVES

- To determine if Ultrasound provide a better and faster diagnosing method for evaluating patients presenting with abdominal pathology



To determine that ultrasound minimize additional test the patient had to undergo to obtain final diagnosis so as to minimize cost and decrease the stay of patient time in the hospital to stretched the hospital budget.



89% of Patients waited at least 1 day for Ultrasound which corresponds with final diagnosis.

A final aim is to determine if radiation to patients can be minimized and radiation safety of the Radiographer can be improved

- Evaluate what % of A X R was inconclusive or NAD. Note 100% of Pts had a final diagnosis

6	No of patients with inconclusive diagnosis on X-Rays	7	32%
25	No of patients with normal X-Rays (X-Rays NAD)	10	45%

SUMMARY OF RESULTS

The results suggest that US is more effective when evaluating patients with abdominal pathology. requested to evaluated Acute Abdomen.

- The diagnosis on Ultrasound corresponds 82% with the final diagnosis where
- The diagnosis on Abdominal X-Rays corresponds only with 9% of final diagnosis

Conclusion from results

- From the information evaluating the results, the data indicate that Ultrasound is more effective and sensitive when evaluating patient with abdominal pathology with an 82% accuracy whereas X-Rays only has a 9% accuracy.
- When Ultrasound and X-Rays can contribute to the diagnosis of a patient's pathology, then 91% of patients had a diagnosis with Ultrasound where only 14% of patients had a diagnosis with Abdominal X-Rays.

RECOMMENDATIONS

- The Radiographer, Ultrasonographer and Medical officer must work closely in a team to ensure that the patient receives the best service possible.
- If Radiographers can do pattern recognition, there input will benefit the patient as they will perform and report on the X-Rays.

RECOMMENDATIONS(Cont..)

- Medical officers can utelize input from other specialties including Radiographers and Ultrasonographers when deciding what examination will best fit the differential diagnosis present.

LIMITATIONS OF THE STUDY

- A larger sample size can be obtained by sampling over a longer period. Obtaining the information from the patients folders is a difficult task as there are a lot of information that need to be shifted through.
- Completing the Data Capture sheet also need to be upgraded with the vital information extracted from the patients folders.
- Better time management and administrative issues need to be sorted out in time.

Possible impact on the community

- That medical officers will use the most effective image modality if both ultrasound and X-Rays are available.
- **Ensure the patient receive the best treatment as quickly as possible and can minimize the length of stay of patients in hospital.**
- Can minimize the financial expenditure on patients presenting at the emergency unit ensuring a big saving on the hospital budget.
- **Free emergency beds quickly for other patients that present at the emergency room.**

Possible impact on the community cont...

- Besides the above the best impact it will have is to improve service delivery to the patient presenting in the health clinical, hospital, emergency unit or any satellite clinic for the best treatment and care the patient deserve.

AKNOWLEDGEMENT

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THANK YOU