

# Problems regarding emergency ultrasound in Nepal

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**Introduction:** Ultrasound plays an important role in management of emergency patients. This study was performed to define the patterns of indications and to analyze the findings.

**Materials and Methods:** Hundred patients were analyzed for 6 months from 15<sup>th</sup> August 2003.

**Results:** Females were 59 percent. Thirty-nine percent were of 20-29 years age group. Eleven percent presented during 8-9 PM. Provisional diagnosis and clinical history were not mentioned in some requisition forms. Normal findings were present in 18 %. Normal pregnancy was present in 11%. Acute appendicitis was present in 9%. Two were positive for ectopic pregnancy.

**Conclusion:** Ultrasound should be used as complementary investigation and not instead of clinical examination.

**Keywords:** Emergency, ultrasound, appendicitis

## Introduction

Ultrasound has long been recognized as a powerful tool for use in the treatment and evaluation of many clinical entities. The social and economic pressures to triage, diagnose and rapidly treat patients have made the use of ultrasound a primary screening tool for the emergency patients. However, it has been not yet used as focused procedure in selected patients.

Ultrasound plays an important part in the management of emergency patients. Efficient management is dependent on correct and timely diagnosis. However, this modality of investigation should be used in relevant patients only and not for screening all patients. This study was performed to define the patterns of indications and to analyze the findings of the emergency ultrasound.

## Materials and Methods

This is a prospective exploratory study in which emergency and urgent ultrasound was performed on patients who presented to Emergency Department and on admitted

patients who needed urgent ultrasound. Hundred patients were included in this study. The study was performed for 6 months from 15<sup>th</sup> August 2003. The days were selected randomly to introduce variation in case collection. Ultrasound was performed with Medison 8800 Colour Doppler and Aloka 1000 machines. Probes of 3.5 and 7 MHz were used.

The ultrasound examination was performed in ultrasound room of the Department of Radiology of Tribhuvan University Teaching Hospital. In contrast to European and North American setup, patients were referred by the emergency and ward physicians for ultrasound. Round the clock ultrasound service was provided. The ultrasound requisition forms were analyzed to acquire knowledge regarding how much information regarding their patients was given by the clinicians.

## Results

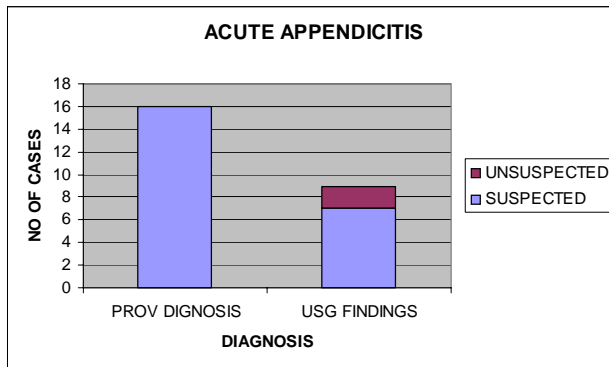
Fifty-nine percent were female and forty-one percent were male. Gender was not mentioned in four percent of ultrasound requisition forms. Thirty-nine percent were in

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20-29 years age group. Seventeen and fifteen were in the groups of 30-39 and 14-19 respectively. Age was not mentioned in 6 percent of forms. Youngest was 14 and oldest was 82. Eleven percent presented during the period of 8-9 PM. Ten and seven percent presented during 1-2 and 3-4 PM respectively. Eight percent presented during each period of 9-10 PM and 12-1 AM. There was at least one patient during each one hour period.

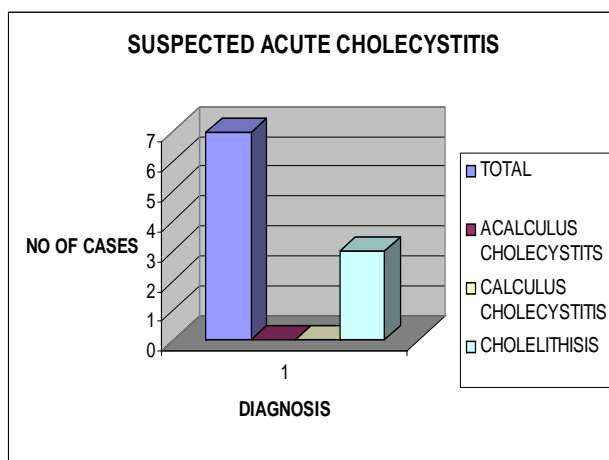
Thirty one percent of forms had no clinical history. Abdominal pain was present in twenty-one percent of forms. Pregnancy was written in ten percent of forms. Right iliac fossa pain was mentioned in six percent of forms. Right hypochondrial pain, acute cholecystitis and distension of abdomen were mentioned in three percent of forms each.

Eighteen percent of forms had no provisional diagnosis. Appendicitis was mentioned in sixteen percent of forms

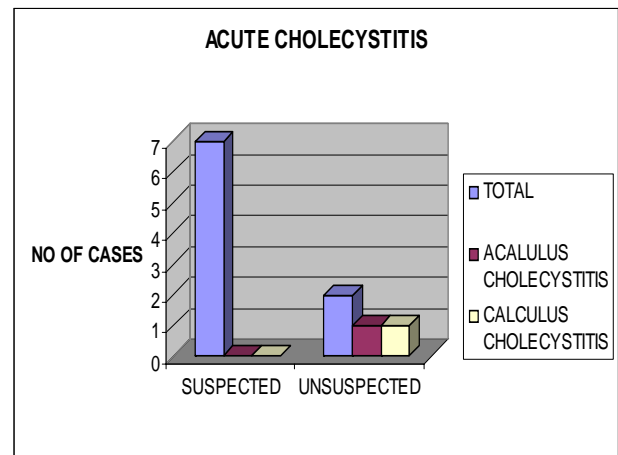


**Fig. 1:** Relation between provisional diagnosis and USG finding in acute Appendicitis

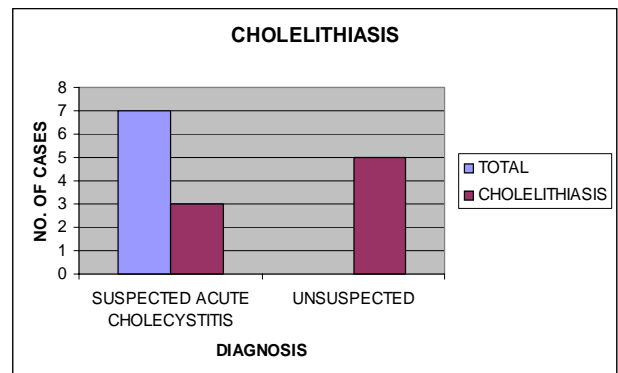
(appendicular lump in three percent of forms). Acute cholecystitis was written in seven percent of forms. Ectopic



**Fig. 2:** Relationship between provisional diagnosis and ultrasound finding in suspected acute Cholecystitis

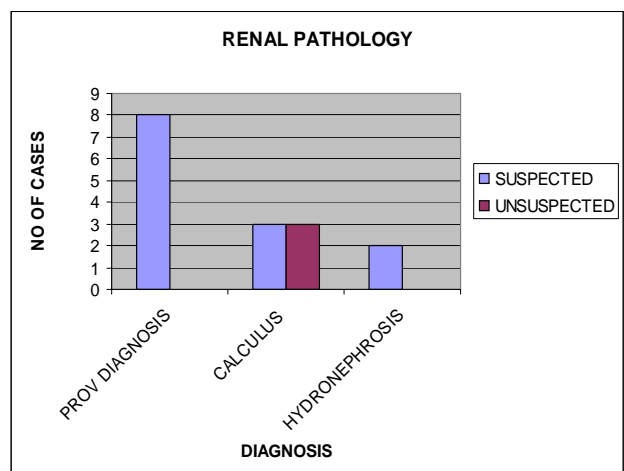


**Fig. 3:** Relationship between provisional diagnosis and Ultrasound finding in acute Cholecystitis

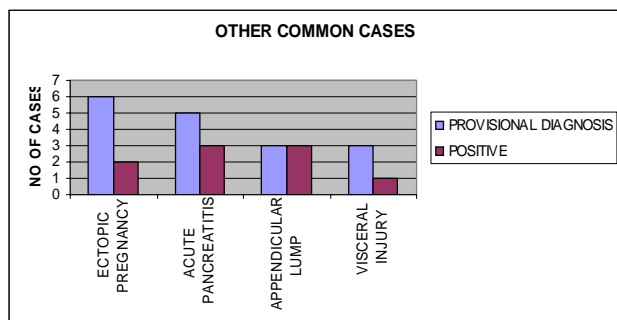


**Fig. 4:** Incidence of Cholelithiasis in acute Cholecystitis

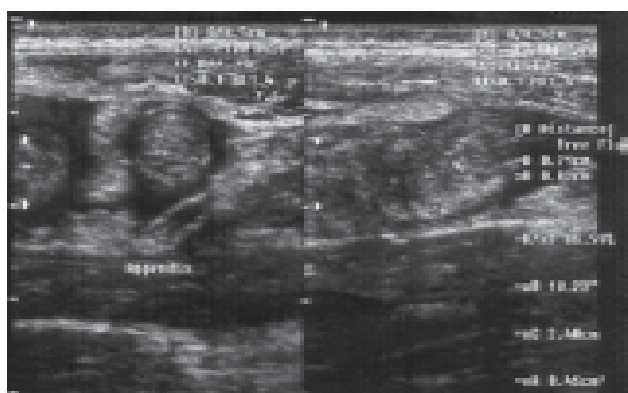
pregnancy was suspected in six percent of forms. Five percent of forms had acute pancreatitis.



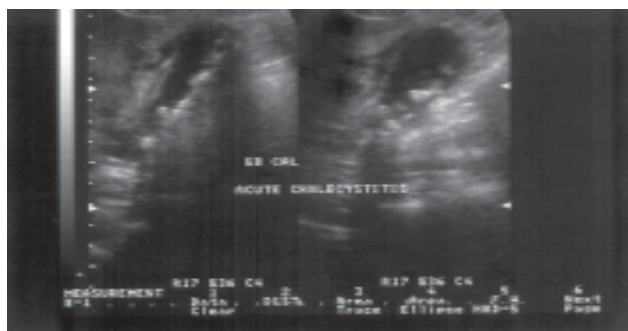
**Fig. 5:** Relationship between provisional diagnosis and Ultrasound finding in renal pathology



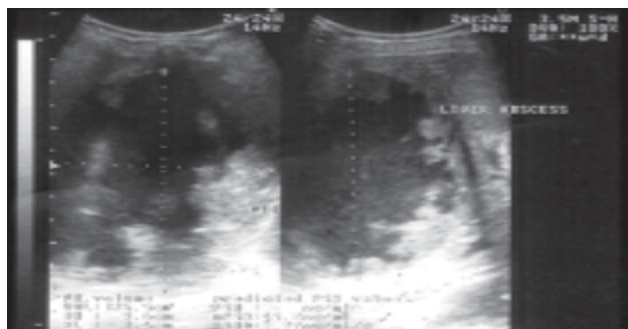
**Fig. 6:** Relationship between provisional diagnosis and Ultrasound finding in other common conditions



**Fig. 7:** Non-compressible enlarged appendix suggestive of acute appendicitis



**Fig. 8:** Cholelithiasis with acute cholecystitis



**Fig. 8:** Liver Abscess



**Fig. 9:** Ectopic Pregnancy

Eighteen and eleven percent were with normal findings and normal pregnancy respectively. Nine percent were diagnosed as appendicitis. Eight percent had cholelithiasis. Two patients of these had acute cholecystitis. Six percent had renal calculi.

Other findings were as following : Psoas abscess, dilated bowel loops, splenomegaly, hepatomegaly, infective hepatitis, renal parenchymal disease, liver abscess, hydronephrosis, pelvic inflammatory disease, missed abortion, haemoperitoneum (traumatic), deep vein thrombosis, umbilical artery doppler [normal] IUGR, incomplete abortion, ectopic pregnancy, ascitis.

Femoral arterial block, fatty liver, collection (post-hysterectomy, post-liver injury, subcapsular spleen injury)

Pleural effusion, pancreatitis, acalculous cholecystitis

## Discussion

Ultrasound is an integral part of management of emergency patients. Efficient ultrasound examination needs accurate clinical details and appropriate provisional diagnosis so that ultrasonologist can take them into consideration. Full bladder is necessary for the early pregnancy and pelvic ultrasound. Urine pregnancy test is required for excluding ectopic pregnancy. Serum amylase will be helpful to diagnose acute pancreatitis.

Twenty one percent of provisional diagnosis matched with the ultrasound findings. Incomplete history has led to chest x-ray done without adequate precautions in one patient with 7 weeks pregnancy which was unsuspected as date of last menstrual period was not mentioned.

Which clinical emergencies are best evaluated by ultrasonography has evolved and continues to evolve with

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clinical practice trends. Some of the thoughts regarding which emergency situations are best evaluated by ultrasonography and which are not are also affected by local clinical customs and workup methods as well as by who is ordering the imaging examinations and in some cases, by the practicalities of available machinery and staff.<sup>1</sup>

In this study, eighteen and eleven percent were with normal findings and normal pregnancy respectively. The most common pathological condition was appendicitis which was present in nine percent. Eight percent had cholelithiasis. Two patients of these had acute cholecystitis. Six percent had renal calculi.

Trauma cases were three percent in this study. In trauma patients, a special technique known as focused assessment with sonography for trauma [FAST] is used. Its main objective is the detection of free intraperitoneal fluid in blunt abdominal trauma. The FAST examination is performed by utilising 4 views : Morrison's pouch, perisplenic view, pelvic view and the pericardium. The morbidity and mortality associated with trauma increases the longer life-threatening injuries are left undiagnosed makes USG a priceless tool. One cannot forget the limitation of this technique. However, when used appropriately, this technique allows the patient to be rapidly assessed and correctly managed.

Six hundred and four patients with blunt abdominal trauma were examined by ultrasound and CT for a study period of 14 years by Sato.<sup>2</sup> Ultrasonography was found to enable experienced examiners to detect and classify parenchymal injuries efficiently, despite disadvantages in detecting superficial and vascular injuries. The sensitivity of ultrasonography with the use of CT and surgical findings as reference standards decreased compared with their prior study. They concluded that ultrasonography should be used to explore not only free fluid but also solid-organ injuries.<sup>2</sup>

Eight percent had cholelithiasis in this study. Twenty-five percent of these had acute cholecystitis. Six percent had renal calculi.

A screening USG is a highly focused, limited, goal directed examination with the purpose of answering a select set of questions. Some questions include :

1. Are there gall stones present ?
2. Is there hydronephrosis evident ?
3. Is there free peritoneal fluid ?
4. Is there a well-defined intrauterine pregnancy ?

A screening USG is not a formal study. Follow-up

confirmatory radiologic studies as an outpatient would be appropriate in the next 2-3 days.<sup>3</sup> Abdominal pain is a frequent complaint in the Emergency Department and often requires a great deal of physician's time and hospital resources to ensure an appropriate diagnosis and safe disposition.

Screening cardiac ultrasound is limited to the detection of cardiac activity in patients with pulseless electrical activity[PEA] and detection of pericardial effusion or tamponade. PEA is defined as the presence of electrical cardiac activity in absence of pulses as in low flow states including hypovolemia, peripheral vascular disease, tamponade and tension pneumothorax

This study has its limitations. A further study should be performed in a larger sample. Correlation of time of arrival and time of ultrasound examination should be performed in addition to correlation of USG findings and final diagnosis at discharge from Emergency Department or ward. Use of screening ultrasound and FAST technique are advisable.

## Conclusion

Ultrasound, which is cost-effective but highly operator-dependent, should be used as a complementary investigation. However, it should not be used instead of performing a clinical examination.

Screening USG is an accepted tool for rapid assessment of patient. Length of stay in the Emergency Department dramatically decreases thus increasing patient's satisfaction while maintaining an even higher standard of care. Better quality of care has translated into improved patient satisfaction as well as better risk management. The patient is able to leave Emergency Department with a firm understanding of their diagnosis. At the same time, the physician has the comfort of discharging the patient in a timely manner and with a definitive diagnosis.<sup>5</sup>

FAST technique should be used in trauma patients.

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