International Journal of Radiology Research
www.radiologyjournal.in
E-ISSN: 2663-4562, P-ISSN: 2663-4554
Received: 06-12-2020 Accepted: 21-12-2020; Published: 08-01-2021
Volume 3; Issue 1; 2021; Page No. 06-09

Assessment of acute abdominal pain in ultrasonography

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Abstract
Purpose: The aim is to investigate the Assessment of Acute abdominal pain in ultrasonography.
Methodology: A prospective Assessment of acute abdominal pain in ultrasonography was conducted for 8 months. During this time the data of experimented images were collected on daily basis along with the clinical history of patients and relevant vital signs also without ignoring the maintenance of equipment and factors adjustments of scanning parameters and the technique skill of the ultrasound used in the particular scan of the particular patients.
Result: A study was conducted in department of radiology at SGT hospital to Assessment of USG in acute abdomen pain. Total 40 patients data used in this study who complain for acute abdominal pain during the period of study. Out of which 77.5% (31) patients undergo USG whole abdomen, 12.5% (5) patients undergo USG lower abdomen and 10% (4) patients undergo USG KUB (kidney, Ureter, Bladder). Result of scan collected and master chart is prepared. Author found that 12.5% patients having acute abdominal pain was due to cholilitheasis,12.5% patients have right renal calculus, 10% patients have left renal calculus, 20% patients have acute appendicitis, 7.5% patients have left ovarian cyst, 7.5 % patients have right ovarian cyst,5% patients have bilateral renal calculus, 5% patients have left Ureteric calculus, 2.5% patients have right ureteric calculus, 2.5% patients have uterine fibroid, 2.5% patients have right ovarian mass and 12.5% patients have normal scan no any findings. In rest 87.5% patients' ultrasound help to diagnose the problem of acute pain.
Patients were categorised to analysis of result of the study in two age groups which were 20-40years and 40-60 years. Only these two groups were made because all patients age within this age range.
In age group20-40years there were total 27 patients out of which 14 were male and 13 were females. Two most common assessments in this group were acute appendicitis in 29.62% patients and left renal calculus 14.8 % patients, rest of the patients were diagnosed with several other findings like right renal calculus, hepatomegaly, cholelithiasis.
And In age group 40-60years there were total 13 patients out of which 6 were male and 7 were females. Two most common assessments in this group were Cholelithiasis in 15.38% patients same results for the left ovarian cyst and second left renal calculus 7.69% patients, rest of the patients were diagnosed with several other findings like bilateral renal calculus, right ovarian mass, uterine fibroid, left ureteric calculus, right ureteric calculus also carry the same percentage 7.69%. Results came out after this study was as follows as shown in table 5.1, 5.2 & 5.3. Table 5.1 shows the analysis of results of USG scan of patients having acute abdominal pain and age range 20-40years.
Conclusion: It is concluded that ultrasound is the best modality to rule out the problems at earlier stage so that treatment can be started on behalf of reports of Ultrasonography scan in patients of acute abdominal pain, as it is fast and safe to patients, it does not includes any ionising radiation so female patients of reproductive age go through scan without any risk. And most common reason of acute abdominal pain as per this study is acute appendicitis, 20% patients having acute appendicitis when USG was performed. 12.5% patients have normal scan no any findings. In rest 87.5% patient's ultrasound help to diagnose the problem of acute pain.

Keywords: patient, ultrasonography, pain

Introduction

Ultrasonography or sonography is often used in medicine. Ultrasound is safe, non-invasive, and does not use ionizing radiation. Ultrasonography frequency range used in medical imaging is 2-20MHz (Mega Hertz).

Ultrasound imaging uses sound waves to produce pictures of the inside of the body. It is used to help diagnose the causes of pain, swelling and infection in the body's internal organs and to examine a baby in pregnant women and the brain and hips in infants. It's also used to help guide biopsies, diagnose heart conditions, and assess damage after a heart attack. Ultrasound is safe, non-invasive, and does not use ionising radiation. Different types of probes, transducer are used to produce ultrasound image. Ultrasound is the only non-ionising radiation used for the diagnosis of disease like PCOD, Renal calculus, Hydronephritis, Ureteric calculus, Liver abnormalities, Pancreas related abnormalities, Gall bladder abnormalities, and Spleen related abnormalities causing abdominal pain.

Types of scans in abdominal ultrasonic imaging

Whole Abdomen Ultrasound Imaging, Upper abdomen Ultrasound Imaging, Lower abdomen Ultrasound Imaging, KUB Ultrasound Imaging in male & female, mentioned different for male and female because of present structures/Organs within the area of scanning were different.

Ultrasonic Machine

Ultrasound machine is a subtraction manufacturing process that removes material from the surface of a part through high frequency, low amplitude vibrations of a tool against the material surface in the presence of fine abrasive practices. Figure number 1.1 shows the ultrasound machine.

Fig 1

How does it work: An ultrasonically vibration mill consists of two major components, a transducer and an electrode, attached to an electronic control unit with a cable. An electronic oscillation the control unit produces an alternating current oscillating at a high frequency, usually between 18 and 40 KHz in the ultrasonic range. The transducer usually consists of a cylinder made of piezoelectric ceramic. The oscillating voltage is applied to electrodes attached to the transducer, which converts the electronically energy in to mechanical vibration. The transducer then vibrates the electrode at low amplitude and high frequencies. The electrode is usually made of low carbon steel. A constant stream of abrasive slurry flows between the electrode and work piece. This flow of slurry allows debris to flow away from away from the cutting area. The slurry usually consists of water (20to 60%by volume) and boron carbide particle. The electrode removes material from the work piece by abrasion where it contact it, so the result of machining is to cut a perfect negative of the electrode's profile in to the work piece. Ultrasonic vibration machining allows extremely complex and non-uniform shapes to be cut.

Abdominal Sonography

Abdominal sonography is a type of ultrasound study, using high frequency transducer (3.5MHz to 5.0MHz). Transducers frequency varies from manufacture to manufacture & model to model. The transducer or probe is the main part of the ultrasound machine. The transducer probe makes sound wave and receives the echoes. The transducer probe generates and receives sound waves using a principle called the piezoelectric (pressure electricity) effect, which was discovered by Pierre and Jacques curie in 1880.

Abdominal sonography is a study used for male and female patients to rule out pathologies in which USG abdomen prescribed. Abdominal Ultrasound examinations are painless &comfortable to all patients. Some women may have discomfort from the pressure of probe or during first time usg scan. Abdominal ultrasound is an imaging technique used to create a image of the organs present in abdominal region. The handheld device that produces the ultrasound waves is used to move over the abdomen after applying ultrasound jelly which helps to maintain good contact between patient body and transducer.

Indications

Abdomenal ultrasonography can used to evaluate problems or abnormalities of abdominal regions. It may also provide accurate information of the genital organs than trans abdominal ultrasound for women who are being evaluated or treated for infertility or for women who are being evaluated or treated for infertility, for women who have difficulty in keeping a full bladder. Ultrasound can also be used during pregnancy. Its capability of producing more complete images means that it is especially useful for identifying ectopic pregnancy, fetal heartbeat, and abnormalities of uterus, placenta, and associated pelvic structures. Ultrasound is performed by radiologists.

Precautions

Studies have shown that ultrasound have not harmful effects like x-rays. They have only sound waves which is not harmful for human being. So there is no need for precautions.

Description

An ultrasound or sonogram, is a procedure that utilizes reflected sound waves to produce a picture of organs and structures within the body. A transducer sends out high-pitched sounds, sounds that are above the range of human hearing, that are reflected back to the transducer. A computer is used to analyze the sound waves, transforming them in to the picture which is called the sonogram,

echogram, or ultrasound scan on a video monitor. These pictures can be saved as a present record of the test.

Preparation of patient

A full bladder is required for an abdominal ultrasound as is required for a Trans-abdominal ultrasound. And May patient is keep on fasting or intake only fluid like water to filling of bladder.

How the test is performed

You will be positioned lying face up on an examination table. Patients may be turned to either side to improve the quality of the images. After you are positioned on the examination table, the radiologist will apply a gel to the area of body being studied. The gel will help the transducer make secure contact with the body and eliminate air pockets between the transducer and the skin that can block the sound waves from passing into your body. The transducer is placed on the body and moved back and forth over the area of interest until the desired images are captured. There is usually no discomfort from pressure as the transducer is pressed against the area being examined.

Doppler sonography is also possible to perform if necessary by using the same transducer. Once the imaging is complete, the clear ultrasound gel will be wiped off your skin.

After care

There is no any after care necessary, if a biopsy was done in conjunction with the procedure. Therefore the patient should be aware of symptoms of an infection and seek care from a health care professional as necessary.

Normal results: In a normal ultrasound, the abdominal structures or organs are found to have no abnormalities.

Findings can be

Abnormal ultrasound results can be done due to a variety of conditions and diseases. These abnormal results may include: Appendicitis, Kidney Stone, Abdominal Mass, Gall Bladder Stones, Abdominal Aortic Aneurysm, Hepatomegaly, Spleenomegaly, Acute pancreatitis, ovarian cyst, ovarian mass, Uterine fibroid, Prostateomegaly.

Most ultrasound scanning is non-invasive. A biopsy is needed to determine whether a tumor that is found during the abdominal ultrasound scan is cancerous or non-cancerous.

AIM

This study is done to investigate the assessment of acute abdomen pain in sonography imaging at SGT Hospital in department of Radio-Diagnosis.

- To assess the most common diagnosis in the patients of acute abdominal pain.
- To find out the findings which can cause acute abdominal pain.

Materials and methods

Research design and methodology are fundamental aspects of the research process. These should be selected cautiously because the success of a research project relies heavily on them. Assessment of acute abdominal pain in Ultrasonography has been performed for many years by many different people for several reasons and thus various methods of data collection for obtaining information for the same are available. For the purpose of the current study the researcher used an approach that suited the requirements of this study. This study was carried out on Ultrasonic abdominal imaging over a period of 6 month in the Radiology department of SGT Hospital.

Total 40 patients were included in this survey. The patient age bar is between 20-60 years.

Discussion and Conclusion

In this study assessment of acute abdominal pain in ultrasonography was done. This study is inspired by a research conducted by M. Antonietta Mazzei *et al*. who performed a study on the role of US examination in the management of acute abdomen. Acute abdomen is a medical emergency, in which there is sudden and severe pain in abdomen of recent onset with accompanying signs and symptoms that focus on an abdominal involvement. It can represent a wide spectrum of conditions, ranging from a benign and self-limiting disease to a surgical emergency. Nevertheless, only one quarter of patients who have previously been classified with an acute abdomen actually receive surgical treatment [7].

An ultrasound test uses high-frequency sound waves to create images of patient's internal organs. Imaging tests can identify abnormalities and help doctors diagnose conditions. An abdomen ultrasound is a type of ultrasound used by doctors to examine abdominal organs. This includes the organs liver, spleen, pancreas, gallbladder, kidneys, ureters, ovaries etc. in this study most common diagnosis is find out in the patients taken as sample of age group between 20 to 60 years. And acute appendicitis was most common finding after calculation of result. This may need clinical as well as surgical treatment to be done. This study performed here because no any study done before on the topic acute abdomen pain assessment.

It is concluded that ultrasound is the best modality to rule out the problems at earlier stage so that treatment can be started on behalf of reports of Ultrasonography scan in patients of acute abdominal pain, as it is fast and safe to patients, it does not includes any ionizing radiation so female patients of reproductive age go through scan without any risk. And most common reason of acute

abdominal pain as per this study is acute appendicitis, 20% patients having acute appendicitis when USG was performed. 12.5% patients have normal scan no any findings. In rest 87.5% patient's ultrasound help to diagnose the problem of acute pain.

Contributors

All authors contributed to the conception or design of the work, the acquisition, analysis, or interpretation of the data. All authors were involved in drafting and commenting on the paper and have approved the final version.

Funding

This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The author has no conflict of interest.

Disclosure

The author did not receive any type of commercial support in forms of either compensation or financial support for this study.

Ethical approval & Informed consent was obtained from all participants.

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