

# Role of ultrasonogram in chronic lower abdominal pain: special reference to gynecological problems

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## Abstract

Abdominal Pain is very common reason for Out Patients Department and ward visit. In Pediatric population almost more than half cases are not having any specific reason for that. These are classified as Functional Abdominal pain. Many times patients insist for radiographic evaluation. It is worthy to check if there is any gynecological issues in these cases.

**Key words:** Abdominal pain, Chronic abdominal pain, Ultrasonogram

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## Introduction

Abdominal pain is a common problem & constitutes about 3% of the hospital visit among adults [1]. It may be acute or chronic. Chronic abdominal pain is defined as continuous or intermittent abdominal discomfort lasting for more than six months. It may occur due to problems of the gut, biliary tract, pancreas, gynaecological or genitourinary origin. Sometimes Chronic abdominal pain may be part of a functional syndrome [2]. The term "chronic abdominal pain" also includes "recurrent abdominal pain," which is characterised by more than 3 episodes of abdominal pain; severe pain sufficient to affect daily activities; symptoms lasting more than 3 months; and absence of any organic cause [3]. Chronic abdominal pain usually occurs beyond 5 year of age & nearly 10% of children require detailed evaluation.

The usual Presenting features of chronic abdominal pain include undifferentiated abdominal pain (Functional, inflammatory bowel disease, coeliac disease, mechanical obstruction, irritable bowel syndrome) [4], intestinal colic, symptoms suggestive of Crohn's disease, pelvic or iliac fossa pain (gynaecological disease, Crohn's disease, functional syndromes), dyspepsia, biliary symptoms, right upper quadrant pain & renal tract symptoms. Majority will subside with appropriate symptomatic treatment. However signs like iron deficiency anaemia, blood in stool, awakening at night with gastrointestinal

symptoms, unexplained weight loss, family history of colorectal cancer & age at onset over 50 years should provoke detailed workup study [5,6]. The evaluation of Chronic Abdominal Pain will lead to an etiological diagnosis which may involve varied systems. Genitourinary causes include Congenital abnormalities, Endometriosis, Ovarian cyst, ovarian cancer, Renal calculi, Sequelae of acute Pelvic inflammatory diseases; Gastrointestinal causes include Celiac disease, Chronic appendicitis, cholecystitis, hepatitis, pancreatitis, pancreatic pseudocyst, Colonic/ gastric/ pancreatic cancer, Crohn disease, Granulomatous enterocolitis, Hiatus hernia with reflux, Intestinal Tuberculosis, Lactose intolerance, Parasitic infestation (giardiasis), Peptic ulcer disease, Postoperative adhesive bands & Ulcerative colitis.

Systemic disorders like Abdominal epilepsy, Familial angioneurotic edema, Familial Mediterranean fever, Food allergy, Immunoglobulin A-associated vasculitis (formerly Henoch-Schönlein purpura), Lead poisoning, Migraine equivalent, Porphyria and Sickle cell disease also present with chronic abdominal pain [7].

Hence the evaluation of chronic abdominal pain requires a thorough understanding of the etio-pathogenesis, epidemiologic spectrum & a knowledge of the varied patterns of presentation. There are multiple modalities of investigations including conventional abdominal radiographs, ultrasonogram, computed tomography, magnetic-resonance imaging, Laparoscopy and endoscopy. Sometimes an invasive

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procedure like Biopsy may be required for an etiological diagnosis for chronic abdominal pain. Abdominal ultrasound is a common imaging test used to examine various abdominal organs [8]. It remains as choice of investigation in the initial test for patients presenting with right upper quadrant pain. It is considered choice of test with compression for children below 14 years presenting with right lower quadrant pain. The American Council of Radiology has recommended ultrasound as the initial imaging study for right upper quadrant pain, regardless of presence or absence of fever, raised white blood cell count or a positive Murphy's sign. A recent meta-analysis done on 2012 has found that ultrasound has a sensitivity of 81% & specificity of 83% for diagnosing acute cholecystitis [9].

Use of Ultrasonogram for chronic abdominal pain has many advantages like high-resolution imaging technique, good versatility & real-time imaging capability, wide availability, inexpensive, painfree, non – invasiveness, easy-to-use, extremely safe and most important the absence of any ionizing radiation. It is useful to find the cause of abdominal pain, kidney infections, diagnose & monitor tumors, ascites, renal & gallstones, to evaluate pelvic or scrotal pain, abscesses, inflamed appendix, identify abnormal abdominal fluid & evaluating those presenting with pain & vomiting. It gives a clear picture of soft tissues pathology missed in x-ray images. Because of its real-time imaging, it is useful for FNAC and fluid aspiration. Its real-time dynamic examination helps analyse bowel motility & blood flow [10].

Depending upon the location of the symptoms ultrasonogram can be done like Upper abdominal ultrasound, Pelvic abdominal ultrasound, transvaginal ultrasound, transrectal ultrasound, endoscopic ultrasound. Upper abdominal ultrasound is indicated for the evaluation of Right Upper Quadrant/ epigastric pain along with raised liver/ pancreatic enzymes. For lower abdominal pain, Pelvic abdominal ultrasound, transvaginal or transrectal ultrasound can be done [11].

An abdominal ultrasound can also be used as a diagnostic tool for conditions such as Abdominal aortic aneurysm, Hydronephrosis, Portal hypertension, Obstruction of bile ducts, Cirrhosis, blood clot/ fluid in abdominal cavity, hernia, kidney blockage or tumour. Ultrasound is useful for suspected Crohn's disease due to its high negative predictive value [12,13]. Pelvic ultrasound is the most important investigation for women of reproductive age with suspected endometriosis, ovarian or other adnexal disease [14].

Renal ultrasound is useful for ruling out renal obstruction, intra-renal calculi & renal masses [15]. Visualization of morphologic changes in chronic pancreatitis by transabdominal ultrasound has varying diagnostic accuracy with a sensitivity of 70% to 80% [16,17]. One large study reported sensitivities for Ultrasound to be around 85% for features calcifications, pancreatic duct dilations & cysts which is comparable to CT [24]. Ultrasonogram also helps in assessing the severity of disease as in chronic pancreatitis [18,19].

Here as the disease worsens, the pancreas loses its hyperechogenicity & becomes progressively heterogeneous due to focal inflammation [20,21]. This progressive inflammation & fibrosis & irreversible structural changes involving parenchyma & pancreatic duct can be evaluated using Ultrasonogram [22,23]. It also detects late stages where there is irregularly dilated Main pancreatic duct, Pseudocysts with pancreatic & intraductal calculi and pancreatic atrophy [20,24].

Though extremely useful, ultrasound is highly operator dependent. As Ultrasound waves are disrupted by air or gas it can not be used for imaging air-filled bowel or organs obscured by the bowel. Similarly for obese patients, imaging can be difficult due to greater amounts of tissue attenuating the sound waves. Though ultrasound cannot differentiate a benign or malignant tumor, it can be used during biopsy guiding the placement of the needle. It is also useful to drain fluid from a cyst or abscess & to examine blood flow inside the abdomen.

Ultrasonogram among children is different as several factors are unique including increased radiosensitivity to ionizing radiation, smaller body size & less body fat [25]. The spectrum of the Chronic Abdominal Pain is also different among Children. The different types of chronic abdominal pain among children are Abdominal migraine, Functional abdominal pain, Functional dyspepsia & Irritable bowel syndrome. Common causes of chronic abdominal pain in children include Inflammation of esophagus/ stomach, parasitic infections, urinary tract infection, Menstrual cycle, Anxiety & stress from problems at school or home, Constipation, lactose intolerance, peptic ulcer, Crohn disease, Kidney stones & gallstones.

Functional abdominal pain is a very common disorder affecting 1 out of 5 children & adolescents. Doppler ultrasound is a technique which assesses blood flow through arteries & veins in abdomen, liver and kidneys. It is useful to evaluate blockages to blood flow, clots, narrowing of vessels, tumors, congenital vascular

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malformations, reduced or absent blood flow to various organs, greater than normal blood flow to different areas commonly associated with infections. Chronic pain caused by vascular conditions such as mesenteric artery stenosis ('mesenteric angina') are initially best investigated with Doppler ultrasound.

Endoscopic Ultrasonogram with characterization of ductal & parenchymal changes with or without the aid of weighted scores like Rosemont score is currently the gold standard for chronic pancreatitis imaging [26]. Its diagnostic quality is comparable to computed tomography (CT) & magnetic resonance imaging (MRI) [27,28]. Endoscopic ultrasonogram changes correlates with histopathologic findings & extent of exocrine dysfunction [27,29].

Of late modern Ultrasound probes are developed with dynamic frequencies, better depth-focusing technology, high-frequency, significantly better noise reduction & improved resolution are accessible. This helps in better characterization of lesions especially calcifications, where overall reduction of random noise features is important.

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