

Computed tomography findings in Fitz-Hugh-Curtis syndrome

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CASE REPORT

A 22-year-old female presented to the emergency room with severe right lower quadrant (RLQ) pain radiating to the right shoulder. The pain exacerbated with changes in position and coughing; she denied nausea, vomiting, diarrhea and fever. At physical examination, the patient presented with a soft non-distended abdomen with guarding and severe suprapubic, RLQ and right upper quadrant (RUQ) tenderness; normal bowels sound and negative rebound. Pelvic examination revealed a friable erythematous cervix with a yellowish discharge and positive cervical motion tenderness. The laboratory work-up reported a negative B-hGC, leukocytes in the upper limit of normal; basic metabolic panel and liver function tests were within normal limits.

Patient underwent a contrast-enhanced computed tomography (CT) of the abdomen and pelvis which showed diffuse liver capsule enhancement and trace perihepatic fluid (Figure 1). Images of the pelvis revealed a fluid filled tubular structure in the right adnexa concerning for hydrosalpinx/early tubo-ovarian abscess with associated fat stranding (Figure 2). In concern for pelvic inflammatory disease (PID) nucleic acid amplification tests (NAATs) for *C. trachomatis* and *N. gonorrhoeae* was done. Patient received IV antibiotic

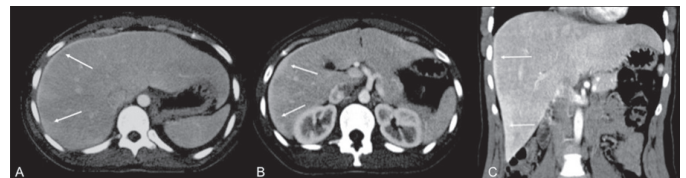


Figure 1: Contrast-enhanced CT axial (A, B) and coronal (C) images show liver capsule and sub-capsular liver parenchyma enhancement on arterial phase.

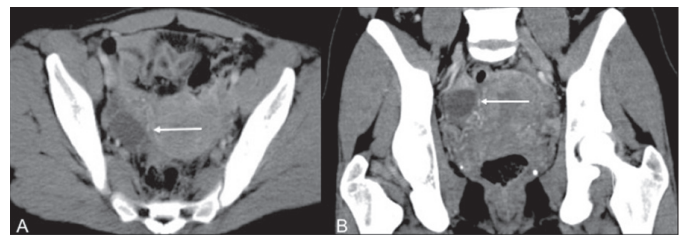


Figure 2: Contrast-enhanced CT axial (A) and coronal (B) images show a hypodense right adnexal focus suggestive of hydrosalpinx/ tubo-ovarian abscess.

treatment with Ceftriaxone and Azithromycin. NAATs came back positive for *C. trachomatis* and she was discharged home to continue antibiotic treatment with oral doxycycline. In the setting of confirmed PID, Fitz-Hugh Curtis Syndrome was the diagnosis explaining the RUQ abdominal tenderness with pleuritic pain and the CT imaging findings.

DISCUSSION

Pelvic inflammatory disease is an infection of the upper female genital tract, which can involve the uterus, fallopian tubes, ovaries, and extend into the peritoneum. It is caused by microorganisms that ascend from the lower genital tract and may result in endometritis, salpingitis, oophoritis, tubo-ovarian abscess or peritonitis [1, 2]. Among the most common organisms causing PID are *Neisseria Gonorrhoeae* and *Chlamydia Trachomatis*, the latter being most frequent. *Trichomonas vaginalis*, *Ureaplasma Urealyticum*, *Mycoplasma Hominis*, and *Mycobacterium Tuberculosis* may also cause PID [2].

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The diagnosis of PID is mainly clinical based on pelvic or adnexal tenderness, cervical friability, exudate from the cervical os and elevated white blood cell count on vaginal secretions; however, about 40% of the cases may be asymptomatic [1, 3]. This contribute to a delayed diagnosis or subclinical evolution of the inflammatory process that may result on long term complications such as, infertility, ectopic pregnancy, chronic pelvic pain, uterine or tubo-ovarian abscess rupture, peritoneal adhesions, intestinal obstruction, hydroureteronephrosis, septic thrombophlebitis and Fitz-Hugh-Curtis syndrome (FHCS) [4].

FHCS was initially reported by Curtis et al. as abdominal wall and liver surface adhesions during surgery; later on, Fitz-Hugh reported peri-hepatitis and salpingitis in association with gonococcal infection [5]. The two layers of the liver capsule are affected secondary to intraperitoneal, hematogenous, or lymphatic spread of the pelvic infection [6].

About 4–27% of PID cases develops FHCS and is more common in sexually active adolescents [6–8]. Typically, FHCS presents as a sharp sudden RUQ pain that worsen with radiation to the right shoulder which exacerbates on inspiration [9]. Although FHCS is always associated with PID, symptomatology of PID such as fever, abdominal pain and vaginal discharge may not be always present; RUQ pain is the most common symptom in FHCS [6, 8].

Diagnosis of FHCS is based on the visualization of purulent and fibrinous patchy exudates between the hepatic surface and the abdominal wall (violin string-like adhesions) on laparoscopic or laparotomy examination. Additionally, the diagnosis can be made by isolation of the causative organism in fluid from the peritoneal cavity or from the liver capsular lesions [6, 9, 10].

Contrast enhanced CT plays an important role in the diagnosis of FHCS. Normally, liver capsule is not perceptible by CT or MRI, however, under pathological liver conditions such as FHCS an intense capsular enhancement on the arterial phase may be seen, due to hyperemia [7, 11, 12]. Persistent hepatic capsular enhancement on delayed images correlates with pathology findings of fibrosis, hyaline degeneration and capsule thickening.

Capsular enhancement in the anterior right hepatic lobe is most frequently seen, likely due to intraperitoneal spread mechanism of the infection [10]. Additional CT findings commonly encountered in FHCS are gallbladder wall thickening and pericholecystic fluid, which can be secondary to the inflammatory process on the hepatorenal fossa. Although the use of US on FHCS is limited, imaging findings that may be seen include loculated perihepatic fluid, fluid in the Morison's pouch, and violin string adhesions may be seen [7, 11, 13].

Capsule liver enhancement is not specific of FHCS; it may be seen in other pathological conditions such as Systemic Lupus Erythematosus (SLE), acute cholecystitis, cholangitis, hepatic abscess, peritoneal carcinomatosis, tuberculous peritonitis, superior vena cava obstruction

and congenital hepatic fibrosis or vascular hepatic variations such as capsular veins and aberrant veins [6, 7, 14].

Common imaging findings of PID are uterosacral ligaments thickening, fascial planes obliteration, presence of fluid in the cul-de-sac, loss of uterine border planes, pelvic fat haziness and peritoneal enhancement [4]. Additional findings are pyosalpinx, tubo-ovarian abscess, oophoritis, endometritis and cervicitis [6, 10].

The severity of PID correlates with depth of hepatic capsular enhancement on the arterial phase of CT imaging (greater than 0.5 cm) and extension of enhancement [10, 14].

CONCLUSION

In the presence of female sexually active patients with RUQ or pelvic pain, FHCS should be consider in the differential diagnosis. Despite the risk of radiation exposure, particularly in a child bearing aged female patient, a biphasic CT (arterial and delayed images) should be consider for the initial evaluation, after abdominal US to exclude more common entities such as acute cholecystitis; however, a negative US does not completely exclude FHCS. PID long term complications may result in infertility, ectopic pregnancy, pelvic adhesions, and chronic pelvic pain. Biphasic CT findings highly correlate with PID pathological staging warranting adequate medical treatment and avoiding unnecessary invasive procedures.

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Juan Francisco Santoscoy – Substantial contributions to conception and design, Acquisition of data, Drafting the article, Final approval of the version to be published

Fabio Mesquita Paes – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Martin Roberto Goyenechea – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission

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Written informed consent was obtained from the patient for publication of this clinical image.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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