

EVMS EM JC CRITICAL REVIEW FORM: THERAPY ARTICLES

Resident: Thomas Hogan

Date: 5/23/22

Citation: Payor, Austin, et al. "Efficacy of Noncontrast Computed Tomography of the Abdomen and Pelvis for Evaluating Nontraumatic Acute Abdominal Pain in the Emergency Department." *The Journal of Emergency Medicine* Dec. 2015, pp. 886-92,

Background:

CT imaging became widely available in the early 1980s however early on CT scanners had fewer detector rings and slower rotation speeds necessitated the use of contrast to enhance clarity. However, given advancements in multirow (up to 256) CT scanners the utility and benefit of contrast material for image clarity has become less certain.

There are several published studies looking at the sensitivity/specificity of non-contrast CT in diagnosing specific pathology such as nephrolithiasis and appendicitis with results that suggest non-inferiority. The authors maintain that there are no published studies focused on short-term (7-day) outcome of abdominal surgery or death in ED patient's that received non-contrast CT for undifferentiated abdominal pain.

Study Objectives:

The study objective was to assess the efficacy of a non-contrast CT scan of the abdomen and pelvis in patients presenting to the emergency department with undifferentiated acute nontraumatic abdominal pain by following them for 7 days and observing for signs and symptoms of clinically significant acute emergent pathology that was missed on initial presentation.

Study Methodology:

This study was at a single center, urban, academic tertiary hospital, which had ED and radiology residents supervised by board certified ED physicians and radiologists.

It was a prospective observational study of a convenience sample of patients.

Performed over a 3-month period

Looked at patients with undifferentiated acute (<72 hours) non traumatic abdominal pain using non-contrast CT imaging during initial assessment in the ED and following them for 7 days.

7-day observational period was chosen with belief that any acute pathology resulting in abdominal surgery, death or repeat contrast CT with an unrecognized intrabdominal process would progress or worsen in the time frame.

485 patients were screened by research associates and 74 (15%) were enrolled in the study.

Inclusion criteria: > 18yo, pain < 72 hours, non-traumatic cause of pain

Exclusion criteria: abd/pelvic surgery within 30 days, were unable to be reached by telephone for f/u, unwilling to give consent, unstable condition deemed by ED provider, suspected renal stone (since non-con CT already standard of care for evaluation), pregnant, known primary or metastatic cancer in abd/pelvis, BMI < 18, or **deemed inappropriate** for study by ED attendings (vague)

Eligible patients were pre-screened in the ED in real-time through Epic. Also, research associates were notified by attendings and residents who believed their patient was a candidate for the study. Gender, onset of pain, location of pain and associated symptoms were recorded.

No inferential statistical methods were used. Researchers reported estimates as frequencies for mean and median.

Patients selected was based on inclusion/exclusion criteria. Patients were checked in person or by

phone at 24h, 72h and 7 days. Failure was defined as: - subsequent contrasted CT showing new findings, associated with original complaint of abd pain that was not seen on non-contrast study, - abdominal surgery or death as a result of intraabdominal process not seen on original non-contrast CT.

Randomization and Blinding

Non-random or blinded study. ED physicians/residents as well as radiologist were aware and briefed of study and worked together in conjunction. Patients had to give written consent for study to be eligible.

What were the results?

74 patients were enrolled (15%). 2 patients were excluded, one left AMA and the other received contrast.

72 patients completed study and were followed for 7 days.

33 patients deemed to have a negative non-con CT for primary abdominal complaint and 39 patients deemed to have a positive non-contrast study.

41 patients admitted with positive initial CT (most common diagnosis renal colic in 20%); 8 of which underwent surgery within 7 days of admission which resulted in 0 failures (95% confidence interval 0-4.9%). 3 of the admitted patients had f/u contrast CT studies within 7 days which showed no change in initial impression (1 pelvic mass, 1 pancreatitis, and 1 colitis)

31 patients were discharged, and all were contacted at 24h, 72h, and 7 days after discharge. No reports of abdominal surgery, death from intraabdominal process, or a repeated contrast CT scan during the 7-day follow-up period

Overall, 0% failure of primary outcome of abdominal surgery or death in all patients that had a negative non-con CT

Applicability to my patient care?

Study was performed at Tampa General hospital which is an urban tertiary center with both ED and radiology residents similar to SNGH. Patient population is similar.

In light of this recent contrast shortage, I believe this study may be applicable in select ED patients. Addition considerations of throughput, cost, patient preference were mentioned but not measured.

Strengths

Not many.

In a select patient population that was not clearly defined, as most were selected Not to be enrolled Results were reassuring. Although small sample size results had 0% failure.

Large urban tertiary center which sees a representative population, although multicentered would be better.

Weaknesses

Small sample size, only 72 patients completed study with 15% enrollment

Single center study

Physician's decided who were eligible for enrollment predisposed to selection bias

Outcome measures were extreme (death or abdominal surgery) and short term 7 days

My Clinical Bottom Line

The bottom line is that this study has major limitations however, the results indicated given a select patient cohort that a non-contrasted CT study may be a reliable modality to evaluate undifferentiated acute non-traumatic abd/pelvis pain.