



## Decreasing Duplicative Imaging: Clinical Decision Support Intervention to Reduce Unnecessary Abdominal Ultrasound Following Abdominal CT

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### Introduction



- Duplicative imaging contributes to unnecessary health care expenditure
- In particular, for patients who have an abdominal ultrasound after an prior abdominal computed tomography (CT) scan, the diagnostic information in question is often available on the CT
- Most common scenario: inpatient acute kidney injury (AKI)
  - Usually due to causes other than renal obstruction
  - Renal ultrasound reflexively ordered
- Acceptable acknowledgement reasons provided to bypass the BPA

## Introduction



- Baseline review of reports on 100 inpatients in 2015-2016 imaged for AKI with renal US revealed absence of hydronephrosis in 89% (89/100)
- Purpose of quality improvement initiative: to reduce unnecessary inpatient and emergency department abdominal US exams in patients who have undergone abdominal CT within 72 hours prior to the US order being placed

## Methods



- Best practice advisory (BPA) created in the electronic medical record (EMR)
  - Advise against routine use of abdominal US in adult inpatients and emergency department patients who had undergone an abdominal CT within the preceding 72 hours
- Patients with transplants and oncology patients were excluded
  - Often unable to receive intravenous contrast enhanced CT, and noncontrast CT provides limited information

## Methods



- Frequency of BPA firing and subsequent ordering behavior were evaluated after integration of the BPA into the EMR in December 2017
- Orders initially cancelled and later imaged with an override during the same admission also not included
- For all patients whose ultrasounds were canceled between January 1 - June 30, 2018, chart review was conducted to confirm that patient care quality and safety were not compromised by omitting the ultrasound
- Subset of 100 patients who had ultrasound performed were reviewed to determine if the test added value

## Methods



- Two separate BPAs were designed, depending whether the CT result was pending or finalized
- Acceptable acknowledgement reasons to proceed with the order were made available with the BPA

BestPractice Advisory - Test Patient

This patient had an abdominal CT in the past 72 hours and may not need an ultrasound. If you believe an ultrasound is still needed, review the CT report or call the Radiology Consult Resident at 443-286-6072 Monday-Friday between 7:30 am and 5:00 pm or contact the on call residents (410-955-2174 or pager 3-RADS) during all other times.

Remove the following orders?

Remove Keep US Abdominal Limited  
Procedure Master:MG1078, STAT, 1 time imaging First occurrence Today at 1038

Acknowledge Reason

Radiologist recommended ultrasound Evaluate gallbladder Evaluate vasculature (CT noncontrast) Transplant Patient

Paracentesis mark: Relevant interval intervention (nephrost... Other (specify in comments))

Accept

BestPractice Advisory - Test Patient

This patient has a pending abdominal CT and so may not need an ultrasound. If you believe an ultrasound is still needed, call the Radiology Consult Resident at 443-286-6072 Monday-Friday between 7:30 am and 5:00 pm or contact the on call residents (410-955-2174 or pager 3-RADS) during all other times.

Remove the following orders?

Remove Keep US Abdominal Limited  
Procedure Master:MG1078, STAT, 1 time imaging First occurrence Today at 1540

Acknowledge Reason

Radiologist recommended ultrasound Evaluate gallbladder Evaluate vasculature (CT noncontrast) Transplant Patient

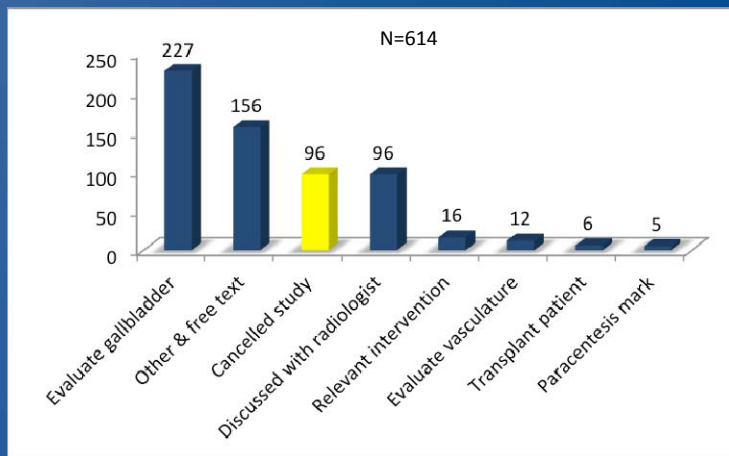
Paracentesis mark: Relevant interval intervention (nephrost... Other (specify in comments))

Accept

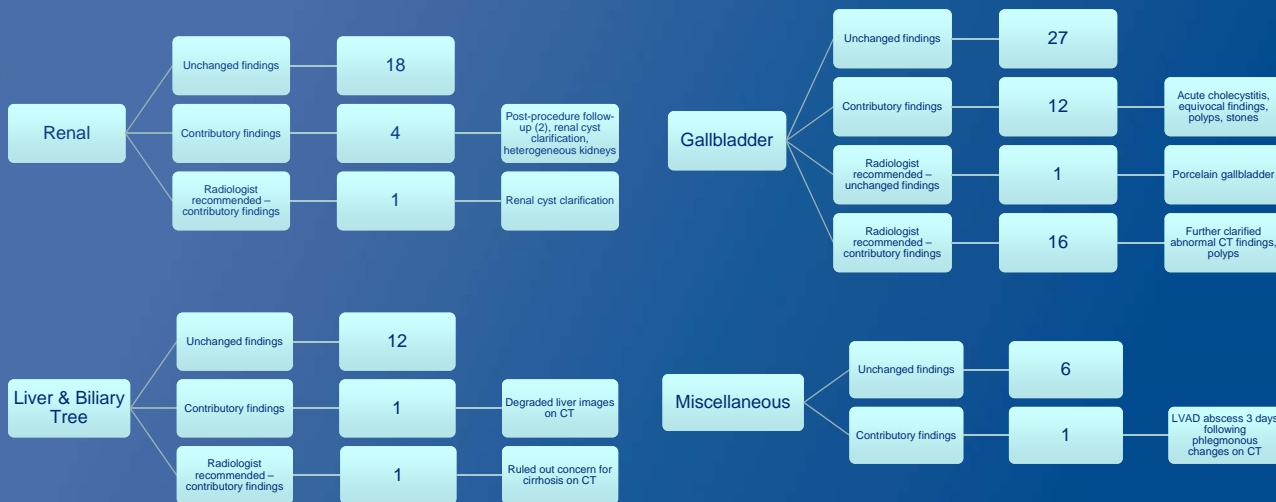
# Results



- In the first six months of 2018, a total of 614 inpatient and ED abdominal US orders were placed in patients with a preceding abdominal CT
- Following the BPA, 16% (96/614) of the US orders were canceled
- Frequency of cancellation and acknowledgement reasons to override were documented
- 20 renal ultrasounds requested by nephrology or urology



## Review of patients who received US following CT (n=100)



## Results



- **Chart review of 96 patients whose US orders were cancelled demonstrated patient care and hospital course not compromised**
  - Review of free text comments demonstrated at least 42 US for AKI or renal stones that could have potentially been avoided
  - Need for better education and prompting modification of the BPA to emphasize that AKI was a primary area of overuse
- **Chart review of 100 patients who received US following CT demonstrated a paucity of contributory findings in evaluation of the kidneys, liver and biliary tree, and various miscellaneous concerns better evaluated on CT**
  - Of note: gallbladder evaluated often revealed clinically significant findings either not depicted by CT or further clarified by US

## Conclusions



- Abdominal CT provides more diagnostic information than abdominal ultrasound in many cases, with the exception of evaluating the gallbladder
- Inpatient and ED abdominal ultrasound may be obviated by a recently performed abdominal CT scan, particularly when ordering renal ultrasound in the setting of hospital acquired AKI
- Implementing a smart BPA to avoid an unnecessary abdominal US in a patient with a recently performed abdominal CT safely reduces wasteful practice to decrease patients' cost of care, but is only effective in a small percentage of patients.
- Performance improvement interventions need to be bolstered to by education and provider feedback reports, which we will be adding in the next phase.