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Are we overdoing it? Optimizing Utilization of Renal Ultrasound in Patients with Recent Cross-Sectional Imaging

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FINANCIAL DISCLOSURE

We do not have any relevant/related disclosures to report.

We will not be discussing unlabeled/investigational uses of medical devices or pharmaceuticals during this presentation.

Introduction

- Renal ultrasound (RUS) is frequently used as part of the routine work-up for acute kidney injury (AKI), and is commonly used to evaluate for:
 - Hydronephrosis
 - GU obstruction/nephrolithiasis
 - Kidney mass
- Guidelines established by organizations vary for when such imaging is useful.
- While RUS is a non-invasive, low-cost imaging modality that does not expose patients to radiation, overutilization may lead to increased healthcare costs and resource over-utilization.
- In addition, the identification of incidental abnormal findings on RUS often have minimal clinical relevance, and may subsequently prompt unnecessary additional work-up.

Purpose

- Is it necessary to perform RUS in patients who have already recently undergone CSI, including either abdominal CT or MRI?
 - CSI would have likely shown existing signs of the questioned pathology in the kidneys
- Though there exist some studies in medical literature exploring the general overuse of ultrasounds, there is a gap regarding any quality improvement interventions that have been targeted at reducing over-utilization of renal ultrasounds
- The purpose of this study is to analyze the use of RUS in patients with CSI within the past 48 hours, and how specific interventions may decrease RUS over-utilization and improve imaging resource allocation
- **Problem Statement:**
There is an excess of renal ultrasound orders placed for patients who have already had recent abdominal imaging (CT or MRI) in the past 48 hours for which the information offered by renal ultrasound may be redundant and of little clinical influence to subsequent patient management.

Objectives

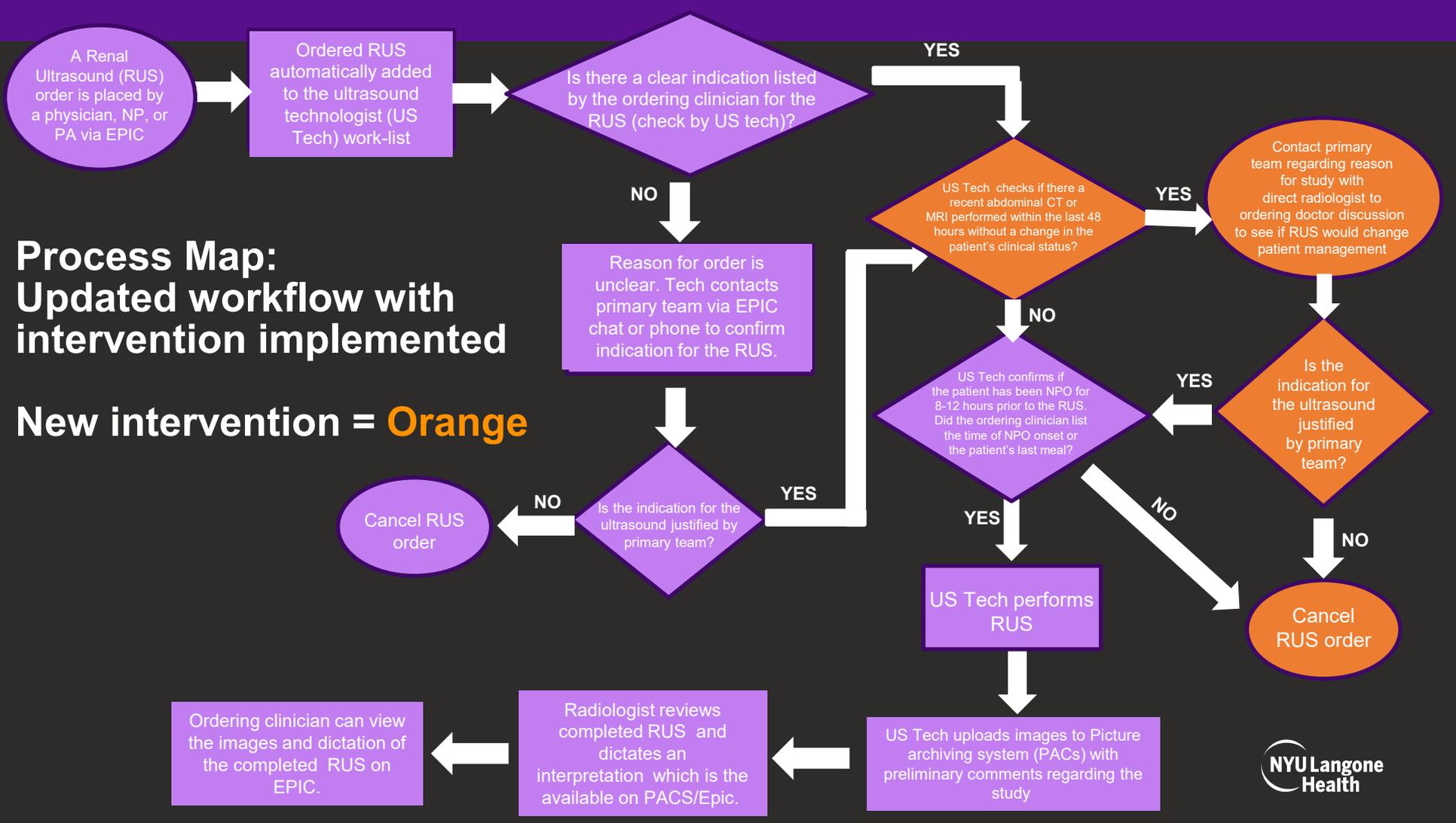
1. Decrease renal ultrasound orders in patients with recent cross-sectional imaging studies that already answer clinical question
2. Allow redundant studies on patients that provide little to no clinical value to be cancelled
3. Improve ultrasound workflow by decreasing number of unnecessary studies
4. Patients with indicated studies of greater clinical value can be scanned and reviewed in a more timely manner
5. Improve use of imaging resources within the hospital system
6. Decrease overall healthcare costs

Methods

- **Study intervention:**
 - *Ultrasound technologists (UST) screen RUS orders and identify patients who have undergone CSI in the past 48 hours.*
 - *They then initiate discussion with the ordering team regarding the benefit of RUS given recent CSI, with recommendation for cancellation of orders determined to be low-yield. Radiology attending to ordering attending communication performed if needed*
- "Pre-intervention" = data collected over a 1 month period prior to intervention
- "Post-intervention: = data collected over a 3 month period after intervention implementation
- Pre- and post-intervention data was compared via Chi-square test
- This study was identified as IRB-exempt
- 4 trainees (1 medical student, 3 radiology residents) and 2 attending radiologists reviewed electronic medical record (EMR) data of patients with RUS orders within identified pre- and post-intervention periods
- Information recorded for patients for whom RUS was ordered include:
 - Recent CSI within 48 hours
 - Study indication
 - Ordering department
 - Clinical benefit (measured by confirming whether or not the RUS findings were congruent with the renal findings identified on recent CSI by reviewing radiology reports)

Process Map: Updated workflow with intervention implemented

New intervention = **Orange**



Results

- Of the pre-intervention group (N=210), 9.04% (19/210) of RUS orders were for patients who had undergone CT/MRI CSI in the previous 48 hours.
 - 100% of these RUS orders were for clinical indications *already answered* on previous imaging.
- Post-intervention group (N=714), 6.02% (43/714) of orders were for patients who had undergone recent CSI.
 - 32.56% of these RUS orders were deemed clinically beneficial
 - The remaining **67.44%** were for indications ***already answered*** on CSI studies.
- Of these post-intervention orders for patients with recent imaging:
 - 62.79% (27/43) were ordered by internal medicine providers, compared with other specialties
- ***The percentage of RUS orders for patients with recent CSI decreased from 9.05% to 6.02% with this intervention (p=0.12).***

Discussion

- Intervention of US tech review of RUS orders for patients who have undergone CSI within the past 48 hours provides *some benefit* in reducing redundant RUS studies, though not statistically significant.
- Following analysis of these findings, a **best-practice advisory (BPA) tool** was implemented for ordering clinicians that notifies of a recent CT or MRI, and confirms his/her decision to pursue the order (see below).
- This tool also notifies the receiving UST of recent imaging and encourages communication with the clinician.
- **In the first month of BPA use, 34.5% of RUS orders were canceled after BPA was triggered.**

BestPractice Advisory - Demo, TestPatientOne

! You are trying to order an ultrasound of the kidneys on a patient who has had a recent CT or MRI of the abdomen. As the prior study might have already provided the necessary diagnostic imaging, do you still wish to proceed?

Remove the following orders? US KIDNEYS AND/OR BLADDER WITHOUT DOPPLER
Routine, 1 time imaging, today at 1215, For 1 occurrence Release to patient: Immediate Do you want an expedited read? No

! Acknowledge Reason Clinician Acknowledged Significant Clinical Status Change

Accept

This patient has had recent abdominal imaging. As the prior study might have already provided the necessary diagnostic imaging, please confirm necessity with ordering provider.

Conclusions

- A quality improvement initiative was implemented in order to reduce the number of RUS ordered for patients who have undergone CSI in the past 48 hours, with the goal of reducing the number of redundant studies, optimizing ultrasound workflow, reducing healthcare cost, and improving radiology resource utilization.
- The intervention involved screening of incoming RUS orders by US techs; if the pt has had CSI in the past 48 hours, the tech contacts the ordering team to review the study indication, and encourages cancellation of the order if the clinical question was already answered on this recent imaging.
- Prior to intervention, **9.04%** of RUS orders were for patients who had undergone CSI in the previous 48 hrs; 100% of these RUS orders were for clinical questions already evaluated on previous imaging.
- After implementation of this intervention, only 6.02% of orders were for patients who had undergone recent CSI; **67.44% of these orders** were for indications **already answered** on CSI studies.
- **The percentage of RUS orders for patients with recent CSI decreased from 9.05% to 6.02% with this intervention (p=0.12)**

Thank You!

To all our team members, especially Dr. Recht for spearheading IT involvement with this QI initiative