



Evidence-based Practice for Improving Quality

Approach to Diagnosis of Gut Injury

**Dr. YASSER
ELSAYED**

**Dr. Molly
Seshia**

**Dr. Deepak
Louis**



Objectives



To demonstrate the difference between the conventional approach, and the new approach.



Case scenarios to highlight the limitations of the conventional approach.



The impact of the approach.



Preterm 30 weeks, at 2 weeks of age passed multiple frank blood per rectum.

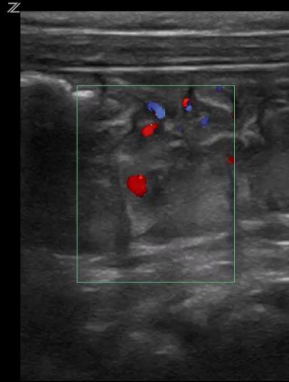
CRP was 6 (twice), unremarkable CBC and blood gases

Normal ultrasound 6 hours after AXR



LUQ

12
3



Outcome: feeding restarted after IUS and was well tolerated



Preterm 26 weeks, hemodynamically stable, at 2 weeks of age developed pancytopenia, and high CRP.

CRP was 196 (rising), no lactic acidosis

Severe NEC by ultrasound, bowel ischemia by NIRS



LUQ



Outcome: Operated 2 weeks later, bowel with patchy ischemia and necrosis.



Rehan, Seshia, Johnston, Reed, et al.

Table 1

**INTRADOBSERVER AGREEMENTS FOR VARIOUS OBSERVER CATEGORIES
AND INDIVIDUAL RADIOLOGIC SIGNS AND DIAGNOSIS OF NECROTIZING ENTEROCOLITIS**

Radiologic Sign	Neonatologist	Radiologist	Neonatal Fellow	Pediatric Resident
Intestinal distension	0.47 (0.24–0.58)	0.43 (0.34–0.52)	0.50 (0.20–0.52)	0.34 (0.26–0.47)
Air fluid levels	0.42 (0.26–0.63)	0.60 (0.43–0.76)	0.46 (0.41–0.49)	0.28 (0.11–0.51)
Bowel wall thickening	0.48 (0.46–0.52)	0.52 (0.48–0.55)	0.36 (0.33–0.39)	0.31 (0.15–0.47)
Pneumatosis intestinalis	0.57 (0.42–0.67)	0.63 (0.60–0.66)	0.22 (0.08–0.48)	0.47 (0.33–0.62)
Portal venous gas	0.09 (0–0.37)	0.68 (0.66–0.69)	0.16 (0–0.47)	0.21 (–0.04–0.66)
Pneumoperitoneum	0 (0–0)	0.49 (0.48–0.49)	0 (0–0)	0.40 (–0.03–1.0)
Diagnosis of necrotizing enterocolitis	0.49 (0.28–0.65)	0.49 (0.45–0.52)	0.22 (0.12–0.29)	0.38 (0.33–0.46)

Values are Kappa: mean (range).



Classification of gut injury

144 cases assessed from 2016-2020 (HSC and St Boniface hospital)

Outcomes

Well tolerated

Responded to Hypoallergenic Line 1
Elemental line 2

Feeding was tolerated after
normalized IUS markers

Resolved after surgery

Death or short bowel

Interventions

Feeding was continued

Change formula to elemental

NPO for a variable period of time

Required elective surgery for adhesion or
stricture

Required urgent surgery

Classes

Normal

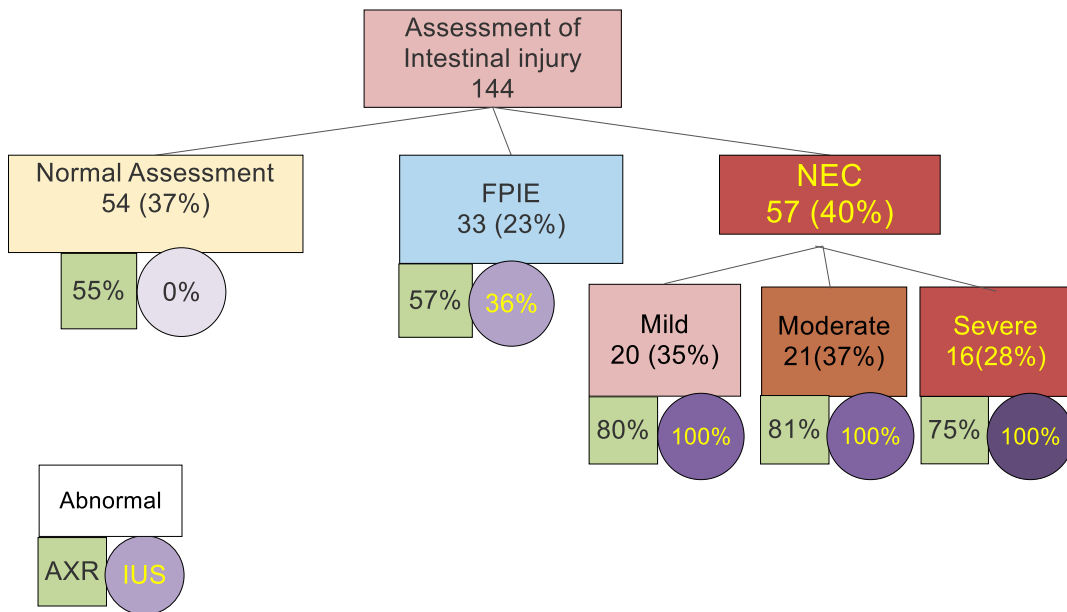
FPIE

Mild gut injury

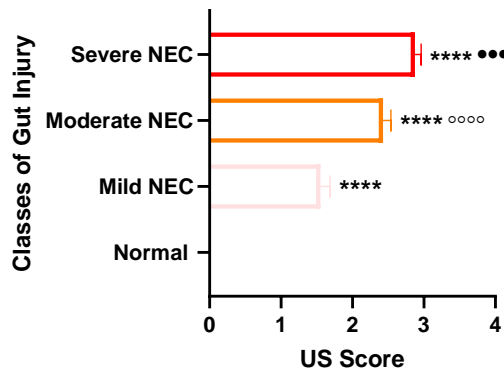
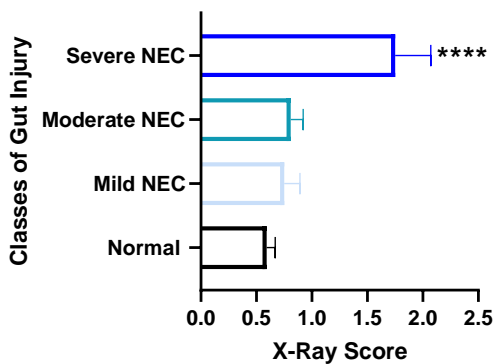
Moderate gut injury

Severe gut injury

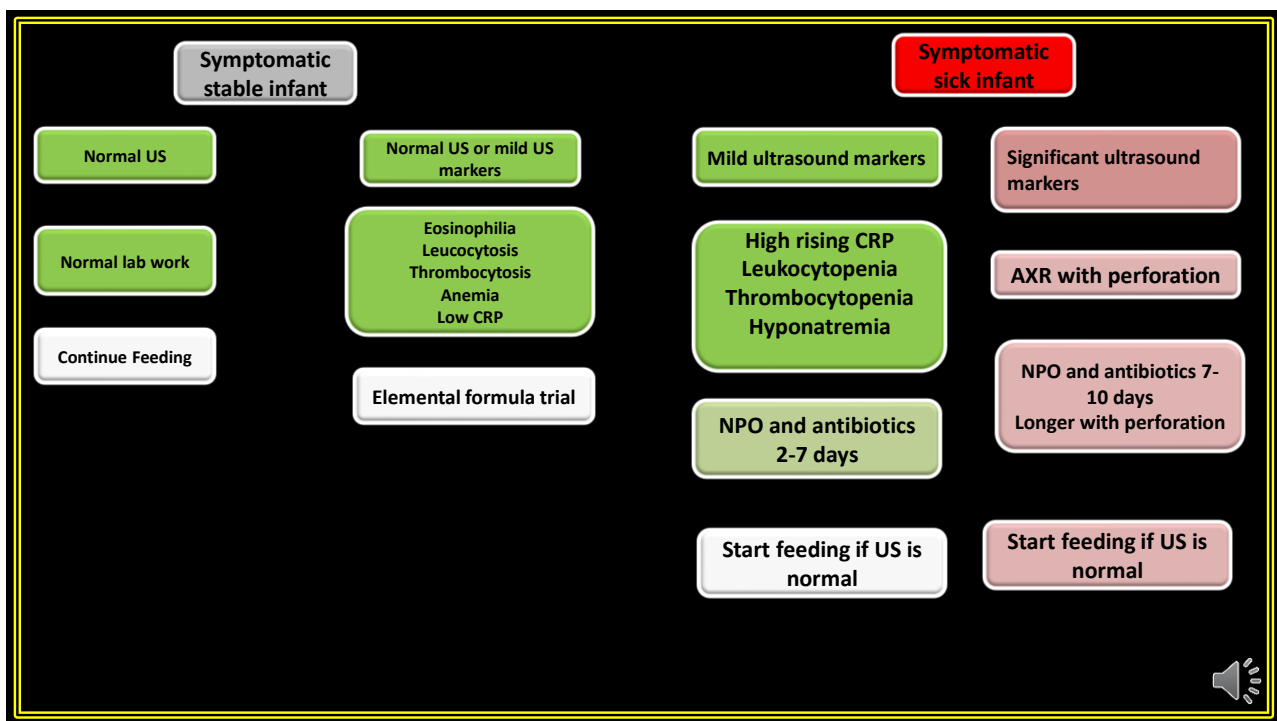
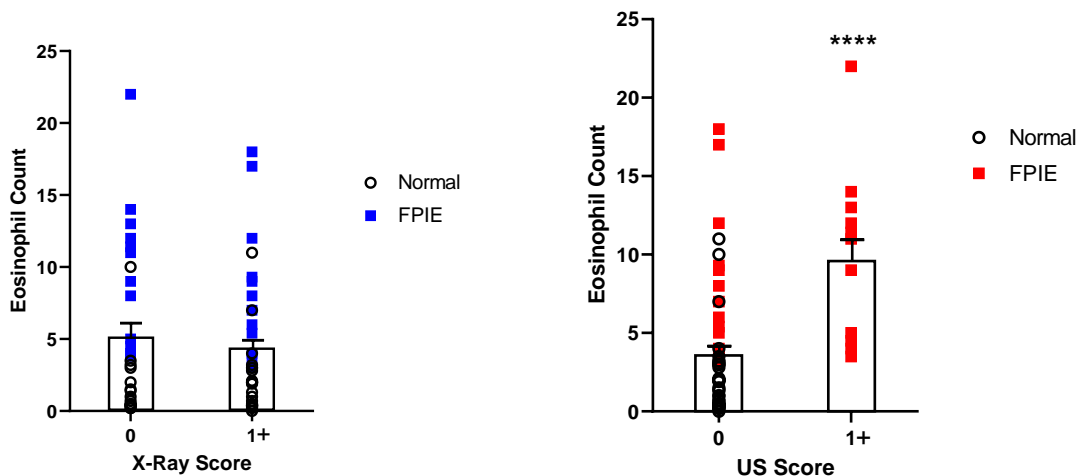




Comparison of XR versus IUS with clinical outcomes



Comparison of XR versus IUS with Eosinophilia in FPIE



The impact of the new approach

On patients and families care

- 49 infant continued feeding although AXR was reported as NEC or with suspension.
- More protection against potential gut injury due to NPO, and antibiotics.
- 490 less days of TPN, liver and gut injury.
- 490 less days of central line and potential infection.
- Feeding intolerance is likely after unnecessary NPO.
- Earlier interventions before further gut injury in severe NEC cases with nonspecific XR and lab work.
- Early detection of gut ischemia (combined IUS and NIRS)

On the health care system

- Saved 490 of extra unnecessary admission days.
- Saved extra unnecessary cost of TPN and antibiotics.
- Avoided unnecessary stress to families and health care team.



Evidence-based Practice for Improving Quality

Thank You



Please email
all questions to
Yasser Elsayed,
yelsayed@hsc.mb.ca