Critical Review Form

Diagnostic Test

Usefulness and Validity of Diagnostic Nasogastric Aspiration in Patients Without Hematemesis,
Ann Emerg Med 2004; 43:525-532

Objective: **"To estimate the values of test characteristics for diagnostic nasogastric aspiration using a cohort of patients admitted for gastrointestinal tract bleeding without hematemesis". (p. 526)**

Methods: **Retrospective chart review with good methods with identification of significant UGI bleeders from two hospitals using fifty-one ICD-9 codes for the principal admitting diagnosis. Inclusion criteria included significant bleeding, as indicated by bloody, black, or dark stools; hospital admission through the ED; confirmatory diagnostic testing within 3-days of admission; and age >17 years. Exclusion criteria included ostomy, obvious anorectal bleeding source or prior admission for GI bleed within the preceding month. After all other eligibility criteria were applied those with hematemesis were excluded.**

The criterion standard was the hospital discharge summary documented source of GI bleeding as supported by confirmatory testing (endoscopy, radionuclide scan, angiography, or surgery). Data were collected by paid abstractors blinded to the study aims with inter-rater reliability assessed by duplicate abstraction of 10% of the total records. Separate abstraction forms were completed at different times for NG-aspirate results and hospital course.

NG aspirate results were coded into one of six categories (bile/no blood, no blood/no bile, flecks of blood < 300 cc, coffee grounds or bright red blood 30 – 450cc, difficulty clearing lavage or > 450 cc coffee ground, or > 450 cc bright red blood) which were collapsed into negative (first two categories) or positive (last four categories) in order to compute diagnostic test characteristics. Nasogastric aspirates were categorized by visual analysis without chemical aids or point-of-care test cards.

Guide	Comments
Are the results valid?	
Did clinicians face diagnostic uncertainty?	Yes, definitive testing had not been performed at the time of ED evaluation when the findings were documented.
Was there a blind comparison with an independent gold standard applied similarly to the treatment group and to the control group? **(Confirmation Bias)**	The criterion standard was the discharge diagnosis. Because results of the NG aspiration or other elements of the history and physical exam could have affected the timing and extent of endoscopic evaluation (*incorporation bias*, *work-up bias*, co-*intervention bias*) the potential for confirmation bias certainly exists.
Did the results of the test being evaluated influence the decision to perform the gold standard? **(Ascertainment Bias)**	Yes, not everyone had EGD performed so cannot truly state that NG aspirate results were negative or positive among those without EGD.

II.	What are the results?	
A.	**What likelihood ratios were associated with the range of possible test results?**	• From 1210 records retrieved, 333 (mean age 67) met eligibility criteria with no significant differences between hospitals for proportion eligible or proportion without hematemesis to those with hematemesis. • κ values for eligibility and GI bleeding source were excellent (0.91 and 0.97). • κ values for positive or negative NG aspirate were also acceptable (0.86, n=54) (p. 528) • 29% did not have NG aspirate offered and of the remaining 235, 15 refused. Compared with those who did not have NG aspiration, those who did were more likely to be hemodynamically unstable (24 vs. 18%) and admitted to the ICU (40% vs. 30%). • 30% of those with NG aspirate (and 48% of those without) did not have EGD performed. • <u>72% of NG aspirates were negative, while only 2% had > 450 cc bright red blood.</u> • Among the 220 with an NG aspirate result 84% had a source of GI bleeding, but only 27% had a definite source of bleeding (active bleeding or adherent clot during confirmatory testing). • While 36/220 (16%) were classified as GI bleeding NOS), review of gastroenterology notes permitted classification of all but 7. <u>UGI source</u> NG aspirate Yes No Positive 44 4 Negative* 62 103 Sen 42% (95% CI; 37 - 44) Spec 96% (95% CI; 92 - 98) LR+ 11.1 (95% CI; 4.5 – 29.2) LR- 0.61 (95% CI; 0.57 – 0.69) Prevalence of upper GI source 49.8% *Includes aborted NG tube attempts

		• Only 61% of subjects with negative NG aspirate had EGD compared with 98% of those with positive NG aspirate (*work-up bias*). • Among 15 with EGD and known bleeding source, NG aspirate predicted he final diagnosis in 54% of cases.

III.	How can I apply the results to patient care?	
A.	**Will the reproducibility of the test result and its interpretation be satisfactory in my clinical setting?**	Probably since similar patients present to EDs with suspected UGI bleed with similar difficulties obtaining an NG aspirate and prompt EGD.
B.	**Are the results applicable to the patients in my practice?**	Yes – similar practice settings and patient populations.
C.	**Will the results change my management strategy?**	Yes – despite the discomfort and potential complications related to NG-tubes, the rare grossly positive aspirate among those without hematemesis substantially increases the likelihood of an UGI source. From the baseline prevalence of 49.8%, a positive aspirate would increase the post-test probability of an UGI source to 91.7% (82 – 97%).
D.	**Will patients be better off as a result of the test?**	Yes, because the risk/benefit ratio of NG aspiration can be more accurately described.

Limitations

1) **Without uniform criterion standard testing (EGD for all subjects), substantial potential for incorporation bias and work-up bias which can artificially increase the measured diagnostic test performance.**
2) **No comparison of diagnostic test performance for those with/without hematemesis due to the exclusion criteria.**
3) **Potential spectrum bias given ED population already suspected of having UGI bleed.**
4) **Retrospective data collection, though bias minimized by methods.**
5) **Under-powered inter-rater reliability assessment.**

Bottom Line

Well-conducted retrospective chart review demonstrating that on the rare occasions (2%) when NG aspiration is grossly positive (> 450 cc bright red blood), an UGI bleeding source can be expected. On the contrary, a negative NG lavage does not significantly after the potential for an UGI source. The diagnostic test performance noted is probably less impressive since this study design left open the

potential for spectrum bias, incorporation bias, and work-up bias. Noting the risks and discomfort associated with NG lavage future prospective trials should ascertain the diagnostic and prognostic performance of positive and negative aspirates in those with/without hematemesis while minimizing these various biases.