The Cost-Effectiveness Analysis of Video Capsule Endoscopy Compared to Other Strategies to Manage Acute Upper Gastrointestinal Hemorrhage in the Emergency Department

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Background and Importance

There is a need for new diagnostic methods for upper GI hemorrhage without having a specialist at the bedside.

A novel approach to acute upper GI hemorrhage is to use video capsule endoscopy (VCE) in the ED to directly visualize the upper GI tract and identify presence or absence of blood.

Goals of This Investigation

Our objective was to evaluate and compare the relative costs and benefits of using VCE compared to other strategies in ED patients presenting with acute upper GI hemorrhage.

Study Design

We constructed a model using standard decision analysis software (TreeAge 2013) to evaluate decision models and perform sensitivity analyses.

FIGURE: PILLCAM ESO 2

Disclosures

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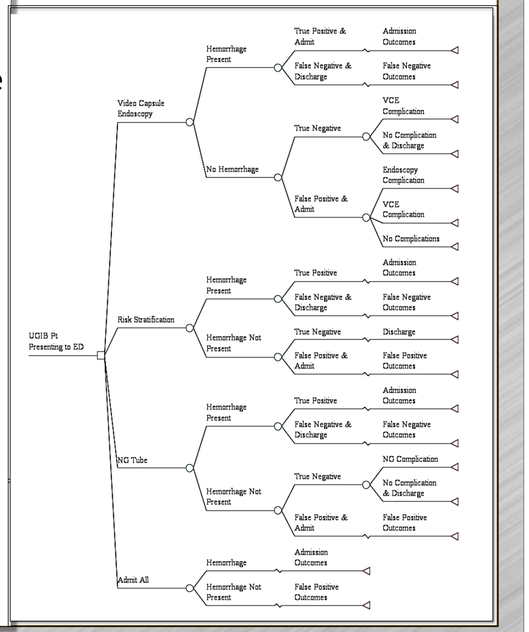
Methods

- Our model examined the cost-effectiveness of four possible diagnostic strategies to evaluate a suspected upper GI bleed:
  1) Direct imaging with VCE,
  2) Risk stratification using the Glasgow-Blatchford score,
  3) Nasogastric tube placement,
  4) Admit-all strategy.
- The model estimated costs, quality-adjusted life-years (QALYs) and incremental cost-effectiveness ratios (ICERs) for a one-year time horizon using a societal perspective.

Model Schematic



Results

Base-case results of a 65-year old presenting to the ED with unexplained hematemesis.

Strategy	Total Cost ($)	Total Effective. (QALYs)	Incremental Cost ($)	Incremental Effective. (QALYs)	Incremental C/E Ratio, ICER ($/QALY)	Dominance
Low Risk						
VCE	$5,690.65	14.69				
NG Tube	$8,159.47	14.69	$ 2,468.82	-0.01	$ (379,852.46)	(Dominated)
Risk Strat.	$16,385.75	14.69	$ 10,695.10	-0.01	$ (1,283,894.59)	(Dominated)
Admit All	$2,276,639.00	14.69	$ 17,075.73	-0.01	$ (1,462,307.88)	(Dominated)
Moderate Risk						
VCE	$ 9,190.04	14.56				
NG Tube	$ 9,486.55	14.58	$ 296.51	0.02	$ 15,891.13	
Admit All	$ 22,584.67	14.54	$ 13,098.12	-0.04	$ (294,524.27)	(Dominated)

EGD, esophagogastruoduodenoscopy; GI, gastrointestinal; NG, nasogastric; ICER, Incremental Cost Effectiveness Ratio; QALY, quality adjusted life year; VCE, video capsule endoscopy,

Results (continued)

- In the base-case scenario for patients at low risk of requiring endoscopic hemostatic intervention, **VCE was the preferred strategy with a cost of $5,691 and an effectiveness of 14.69 QALYs** and dominated all of the remaining strategies including the nasogastric tube strategy (cost of $8,159 and effectiveness of 14.69 QALYs), the risk stratification strategy (cost of $10,695 and 14.69 QALYs) and the admit-all strategy (cost of $22,766 and 14.68 QALYs).
- In the moderate risk group, **VCE continued to be the preferred strategy (cost of $9,190 and 14.56 QALYs)** but no longer dominated nasogastric tube (cost of $9,487 and 14.58 QALYs with an ICER of $15,891). However, the admit-all strategy was still dominated by VCE (cost of $22,584 and 14.54 QALYs).

Conclusions

We have shown that video capsule endoscopy may be cost-effective for low and moderate risk patients presenting to the ED with acute upper GI hemorrhage. Future studies will determine the utility of VCE to safely guide clinical decision making and determine how the use of VCE compares with the current standard of care in the acute ED setting.

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