



A Clinical Decision Support Module Significantly Reduces Ambiguity in Reports of Nuclear Medicine Gastric Emptying Studies

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Overview

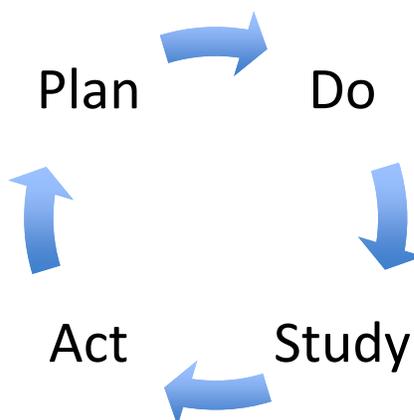
- Purpose
- Methods
- Results
- Conclusion

Purpose

- Nuclear medicine gastric emptying studies (GES) have accepted standards by which they are performed and reported.
- We sought to standardize and improve the quality of reporting of these studies at our academic medical center, by increasing the proportion reported as 'normal' or 'abnormal,' via the design and implementation of a clinical decision support (CDS) module to standardize study interpretation and reporting.

Methods

- We utilized a PDSA quality improvement cycle.
- Plan: Assessment of GES reports.
- Do: CDS module design and implementation.
- Study: Post-implementation assessment.
- Act: Maintenance of CDS module and utilization.



Methods

- 'Plan'
- We reviewed the reports of all GES from January 1, 2015 to August 14, 2015, prior to the implementation of a CDS module.
- Reports were characterized as to whether they conveyed a normal, abnormal, or ambiguous result.
 - Studies with non-standard protocol or aborted studies were excluded.

Methods

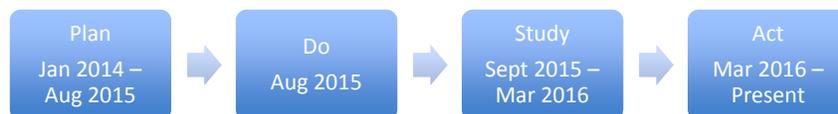
- 'Do'
- The divisional Quality Assurance committee was convened to design a CDS tool for adult GES, following published consensus guidelines. Standard text language was composed based on published guideline cutoff values of gastric emptying at 1, 2 and 4 hours post-ingestion of the standard test meal.
- A CDS module was designed:
 - activation of the module at the time of study interpretation prompts the interpreting physician to input 1, 2 and 4-hour emptying values;
 - the appropriate standard text output is generated and then inserted into the impression field of the GES report.

Methods

- 'Study'
- After a two-week implementation period at the end of August 2015, we reviewed the reports of all GES from September 1, 2015 until March 31, 2016.
- Chi square test was used to compare the proportion of ambiguous reports, between the pre- and post-CDS implementation periods.

Methods

- 'Act'
- After the implementation of the CDS module, its ongoing utilization has been monitored by periodic review.



Results

- Prior to implementation of the CDS module, the default template text in a GES report read:
 - “Solid phase gastric emptying values as above”
 - an ambiguous terminology.
- A total of 320 reports in the Pre-CDS period were reviewed; 25 non-standard studies were excluded.
- In the Pre-CDS period, normal, abnormal, and ambiguous reports numbered 0/295 (0%), 1/295 (0.3%), and 294/295 (99.7%), respectively.

Results

- The CDS module was designed.
- Examples follow.

Clinical Decision Support module

Gastric Emptying Study

Emptying at 1 hr: 16 %

Emptying at 2 hr: 70 %

Emptying at 4 hr: 100 %

Body
Gastric emptying at 1 hr is 16%. Gastric emptying at 2 hrs is 70%.
Gastric emptying at 4 hrs is 100%.

Impression
Gastric emptying study within normal limits.

No Report Changes Close without Changing Report

1. Values are entered into the input boxes.

2. Standard reporting language is generated based on results.

3. Reporting language can be inserted into the report.

Clinical Decision Support module

- If approved by the radiologist, text from the CDS module is inserted into the report.

FINDINGS:

Gastric emptying at 1 hr is 16%. Gastric emptying at 2 hrs is 70%. Gastric emptying at 4 hrs is 100%.

According to accepted international standards using this technique, median normal values for emptying are: 31% at 1hr, 76% at 2hrs, and 99% at 4 hours.

5th percentile values for emptying are:
10% at 1 hr, 40% at 2hrs, and 90% at 4 hours.

IMPRESSION:

Gastric emptying study within normal limits.

Clinical Decision Support module

- Four different report text output fields were agreed upon for use in the CDS module.

Body

Gastric emptying at 1 hr is 16%. Gastric emptying at 2 hrs is 70%. Gastric emptying at 4 hrs is 100%.

Impression

Gastric emptying study within normal limits.

Body

Gastric emptying at 1 hr is 16%. Gastric emptying at 2 hrs is 30%. Gastric emptying at 4 hrs is 100%.

Impression

Gastric emptying study is within normal limits at the four hour timepoint; however, gastric emptying is noted to be delayed at the intermediary time point of two hours, as defined by emptying less than 40% at two hours.

Body

Gastric emptying at 1 hr is 71%. Gastric emptying at 2 hrs is 80%. Gastric emptying at 4 hrs is 100%.

Impression

Gastric emptying study demonstrates abnormally rapid gastric emptying, as defined by emptying greater than 70% at one hour.

Body

Gastric emptying at 1 hr is 16%. Gastric emptying at 2 hrs is 60%. Gastric emptying at 4 hrs is 88%.

Impression

Gastric emptying study demonstrates abnormally delayed gastric emptying, as defined by emptying less than 90% at four hours.

Results

- After the CDS module was implemented, a total of 308 reports were reviewed; 28 non-standard studies were excluded.
- In the Post-CDS period, normal, abnormal, and ambiguous reports numbered 196/280 (69.5%), 80/280 (28.4%), and 4/280 (1.4%), respectively.

Results

- Comparing Pre- and Post-CDS periods, the proportion of ambiguous reports decreased from 99.7% (95% CI 97.9-100%) to 1.4% (95% CI 0.4-3.7%), $p < 0.001$.

Conclusion

- A clinical decision support module, designed to standardize the interpretation and reporting of nuclear medicine gastric emptying studies, significantly decreased the rate of ambiguous reports in a clinical practice from 99.7% to 1.4%.