



A handheld device to detect CO₂ after insertion of nasogastric feeding tubes

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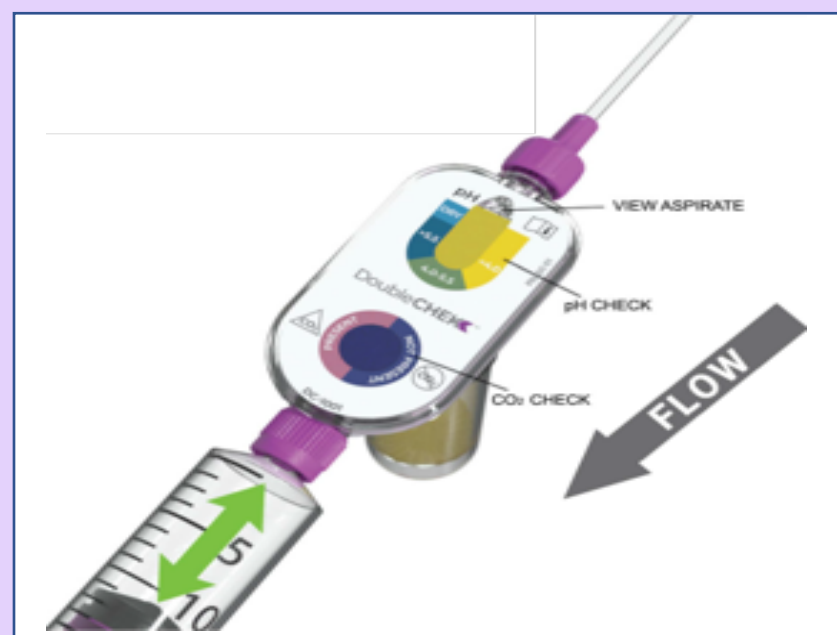
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Background

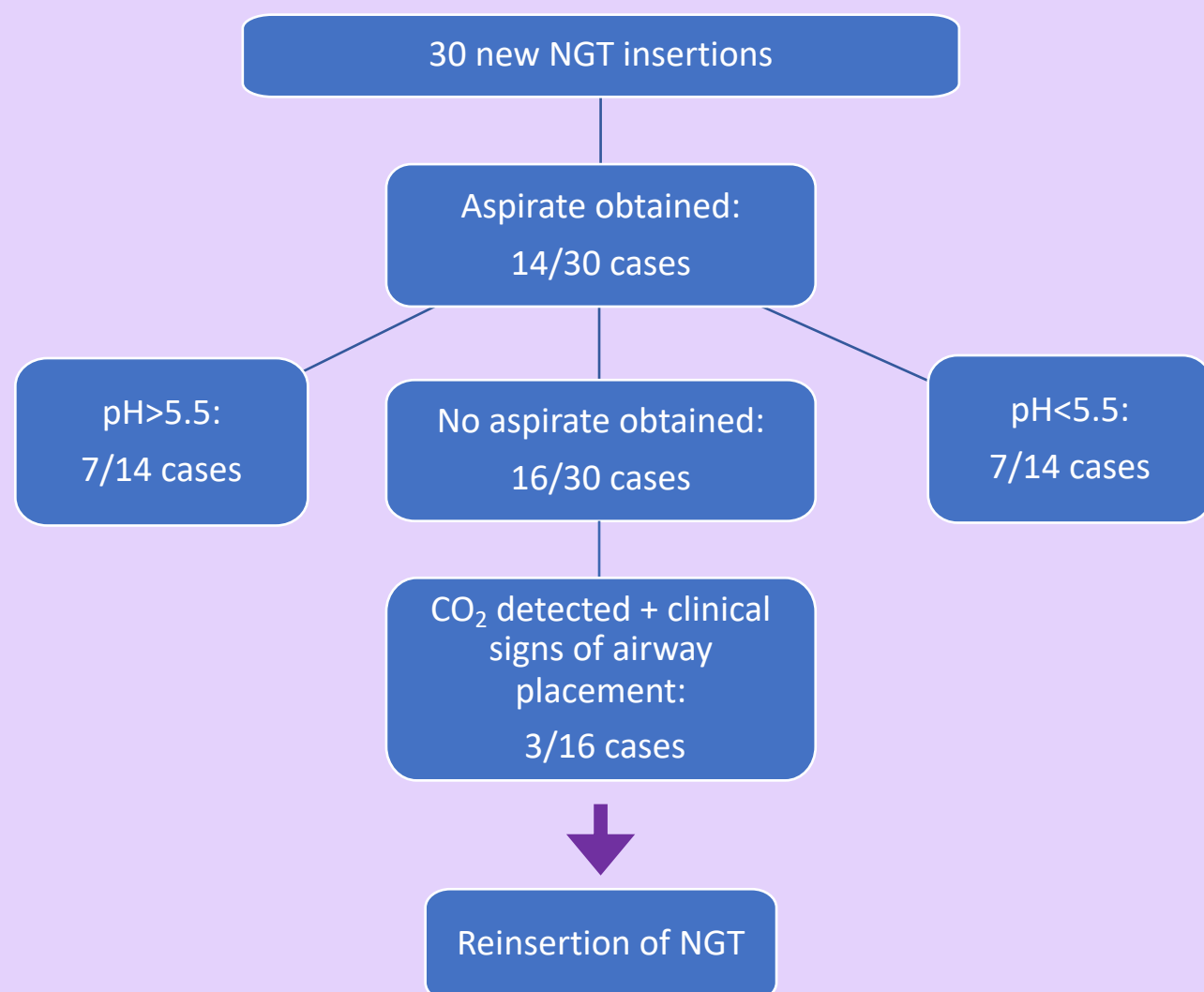
Failure to detect misplacement and use of a nasogastric tubes (NGT) in the respiratory tract prior to commencement of feeding or administration of medication can be fatal and has been classified as a “Never Event” by NHS England [1]. pH testing remains the gold standard procedure for determining correct placement. Gastric pH is often falsely elevated due to administration of antacids. Chest radiographs (CXR) serve as a second line confirmatory method and are often required to confirm correct NGT position in the stomach. A device combining pH testing and CO₂ detection could reduce the need for CXR, improve patient safety and save resources. Here we report first results of a handheld point of care device to demonstrate the usability of CO₂ detection.

Methods

Critically ill patients who were admitted to the Royal Liverpool Intensive Care unit and who required insertion of an NGTs were included in this user evaluation. Where possible, a handheld device for simultaneous measurement of pH in a sealed chamber and CO₂ in the aspirate was used. Data collection included conventional pH measurement of aspirate (if obtained), CO₂ detection using the DoubleCHEK™ device [2], indication for NGT insertion, method of pH detection, results of CO₂ detection and treatment with antacids. In cases in which CXR was requested, the NGT location on CXR was also recorded. Users were asked to complete an evaluation form containing questions about user friendliness, clinical value and and potential for introduction into routine care. Free-text comments about the insertion process and clinical value were also allowed.



Results



pH measurement alone only allowed safe decision to start enteral feeding in 50% of new NGT insertions (flow chart). Clinical signs such as gurgling or airway noise were present in 3 cases where NGT was placed in the airway. In these 3 cases of misplaced NGTs CO₂ was detected by the device. The NGT was removed and successfully reinserted as demonstrated by CXR or pH<5.5 in gastric aspirate.

User acceptance was high, with only 2/29 (6.8%) responders objecting to using the device in daily practice.

CXR results in cases with aspirate pH>5.5

	Position in stomach	Percentage
No	1	14.5
Yes	6	85.7
Total	7	100.0

Conclusions

Simultaneous pH and CO₂ detection is a promising method to avoid misplacement of NGTs. Difficulties in obtaining aspirates and high pH in aspirates are common problems in NGT placement. Misinterpretation of CXRs after NGT insertion is a major cause of patient harm [1]. Devices combining pH and CO₂ detection may be cost efficient and may reduce the need for CXRs and the potential to cause harm. Further clinical trials are warranted to determine sensitivity and specificity of the technique compared to standard protocols and to evaluate the cost-saving potential.

References

- <http://www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid45=129640>
- <https://enteralaccesstech.com>