CO2 detection unlocks the nasogastric tube safety conundrum and prevents respiratory complications: a multicentre international observational study

Dr B. Jones [1], P. MacElhinney-West [2], J. Wakeling [3], G. Gallagher [4], M. Shaughnessy [5].

1 Medical adviser Enteral Access Technologies UK, 2 Matron NHS Humber Health Partnership, Hull, England,3 Lead Nurse Royal Berkshire Hospital, Reading, England, 4 Enteral Access Technologies, Liverpool UK, 5 Enteral Access Technologies Chicago USA

BAPEN 2024

enteral access TECHNOLOGIES

DoubleCHEK™

Introduction

Nasogastric feeding tube (NGT) insertion continues to cause "Never Events" as well as many more pneumothoraces and aspiration pneumonias.

Current UK guidance using aspirate pH and x-rays does not reliably protect against these complications.

A new technique to detect all "blind" misplacements is required to improve NGT safety. CO_2 detection PRIOR to full insertion and use of the tube, coupled with adherence to current pH guidance is a potential candidate.

CO_2 detection is already a standard for confirmation of endo-tracheal tube placement and can be used to detect NGT insertion misplacement before the tube has been fully advanced. X-ray checks are also dramatically reduced when using the novel device DoubleCHEK® (1).

Aim

To observe the use of DoubleCHEK® in a variety of settings to assess NGT misplacement prior to full insertion, aspirate acquisition, pH correlations and user impressions.

Method

DoubleCHEK® was assessed in 16 major hospitals in the USA and UK including paediatric care. This device combines gastric aspirate pH and CO_2 detection at the sternal notch level to detect tracheal misplacement before full insertion. Initial and subsequent insertion checks were assessed.

Results

Initial confirmation was obtained in 113 patients and re-confirmation in 205. CO_2 was detected at the sternal notch level in 21(19%) of initial insertions leading to tube removal and replacement. Aspirate was obtained on full insertion in 267(90%) of 296 assessed and pH was 5.5 or less in 64%.

The correlation of DoublecCHEK® pH with pH strips used locally was 94%. There was no adjudicating technology in place. Indicator colour change assessment was considered very good/good in 97% of 418 checks of DoubleCHEK® CO_2 or pH.

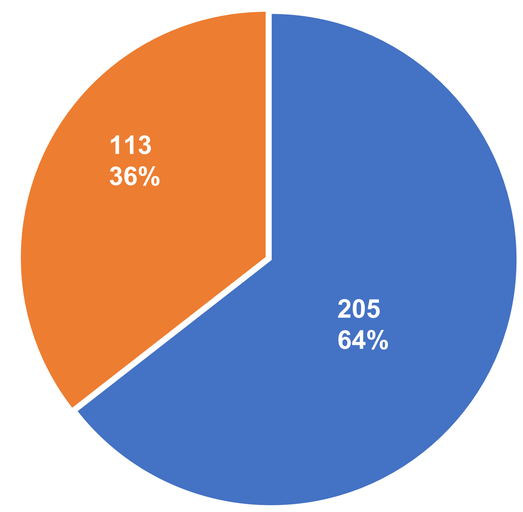
97% staff rated the device quality and "user friendliness" as very good/ good. There were no reported never events or pneumothoraces in this study

Conclusions

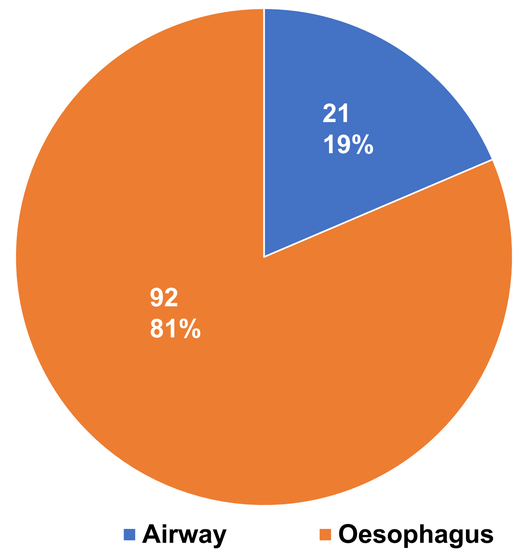
Compared to current techniques for aspirate pH, this new technique was more reliable at obtaining aspirate. Only 0.1ml aspirate is required to detect pH. The technique is applicable to all NGTs and in all settings including paediatrics and neonatology. Each device can be used multiple times on the same patient with minimal training. CO_2 detection confirmed how frequently a "blindly" inserted NGT is misplaced and prevents full insertion. CO_2 detection at the sternal notch level prevents NGT complications prior to full insertion and provides a new approach to NGT safety in all settings. National guidance should move towards inclusion of CO_2 detection

Results

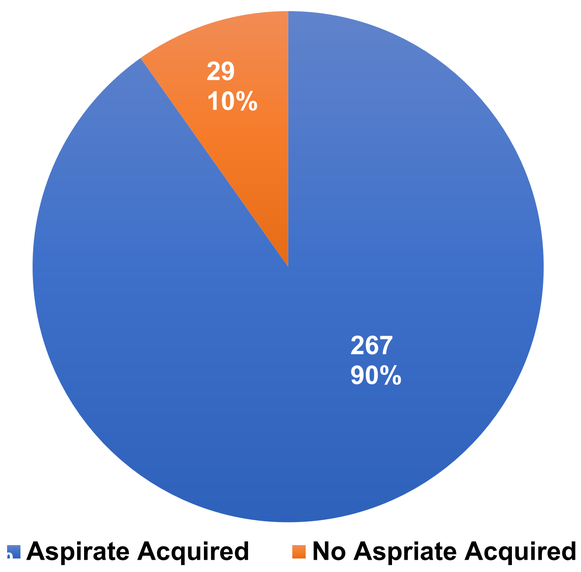
How Was DoubleCHEK Used?



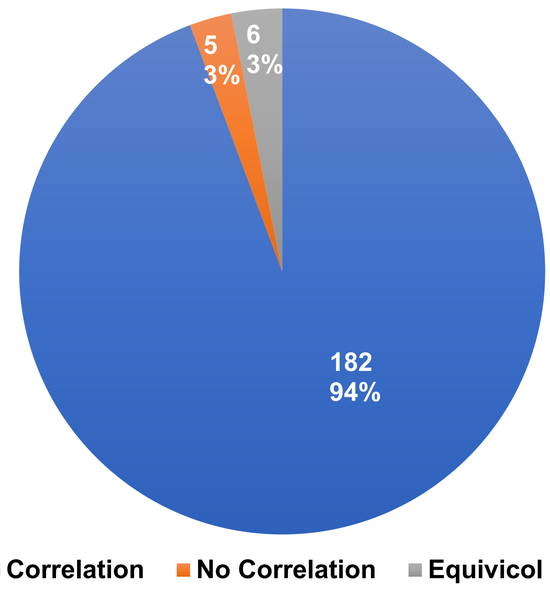
CO_2 Indication @ Sternal Notch



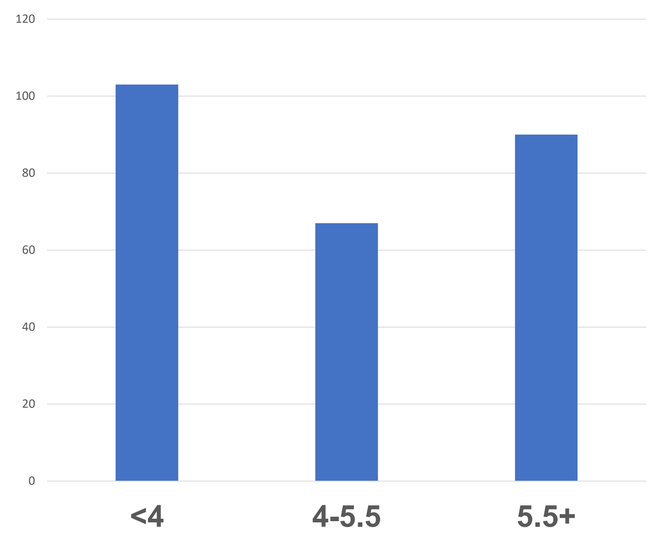
Aspirate Acquisition



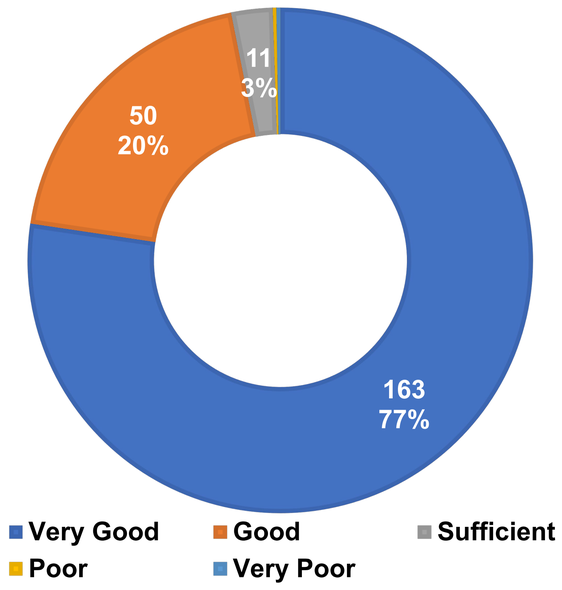
pH Correlation DoubleCHEK vs. Strip



pH Values

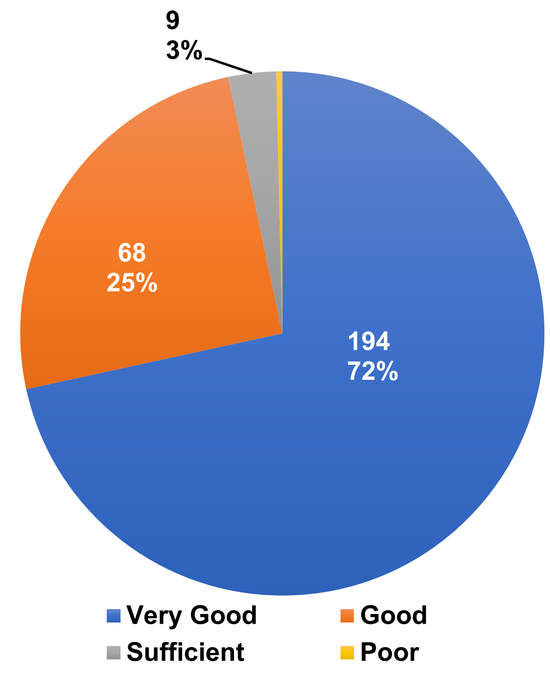


Easy to See Indicator(s) Colour Change



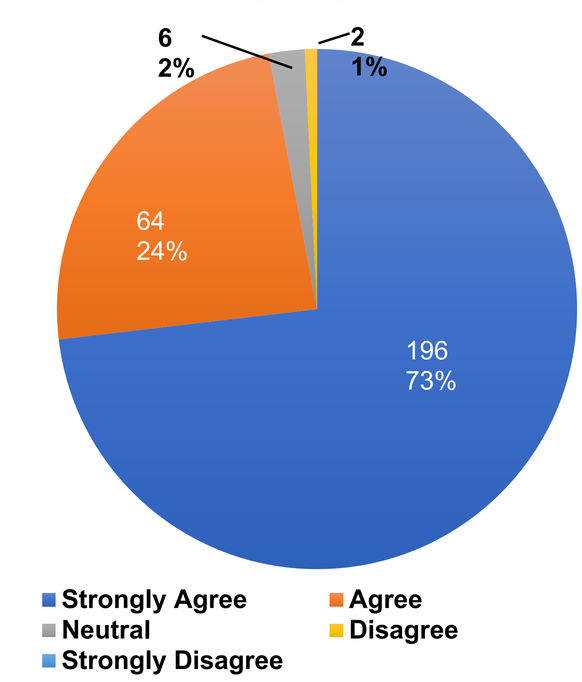
97% Very Good or Good

How Would Rate Quality of DoubleCHEK



97% Very Good or Good

I Would use DoubleCHEK in My Practice



97% Very Good or Good

References

1 MacElhinney-West P, Kaltenbrun T, Middleton A. Enhancing nasogastric tube (NGT) safety and efficiency with the use of CO_2 and pH prevents airway misplacements, reduces delays in tube usage 449 and avoids x-ray exposure and costs. BAPEN 2024. A003