Airway management in paediatric patients with caustic soda ingestion: the EMERGENCY experience in Sierra Leone.

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BACKGROUND

Caustic soda ingestion is a common paediatric issue in Africa, especially in Sierra Leone. Sodium hydroxide is used to produce homemade soap and it is stored where naturally curious children can easily reach it.

Due to the lack of 'child-proof' labelling and packaging and due its natural form (a colourless and odourless substance, in crystals or as a solution) often children ingest it by confusing it with water, sugar or salt.

Whereas data about gastric and oesophageal damage and their treatment are available in literature, little is known about the rate of airways injuries and their consequence on the acute and subacute airways management.

On top of this, dealing with paediatric airways might be even more challenging in LMICs (Low-Middle Income Countries), where technological help and devices available in developed countries are often lacking.

PURPOSE

The main purpose of this preliminary observational study is to evaluate the rate of first-pass success rate.
Secondary aims are to evaluate the frequency of failed endotracheal intubation (ETI) and the rate of perioperative respiratory complications (PRCs):
desaturation *(SpO2 <90% for >45 sec)*, bradycardia *(HR <80 in children <2-years-old; <60 in children >2-years-old)*, laryngospasm and bronchospasm.

Other outcomes evaluated are the rate of: laryngeal damages, ICU (Intensive Care Unit) admission and tracheostomy/eFONA

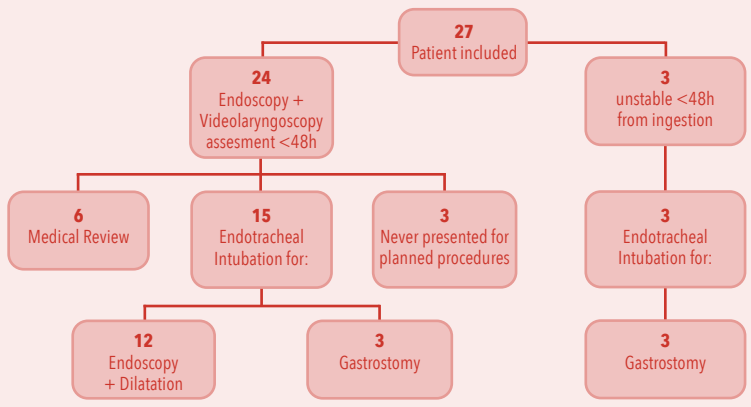
METHODS

Inclusion criteria were all paediatric patients presenting between November 2022 and February 2023 to the 'Emergency' NGO Surgical Center in Goderich (Sierra Leone) because of caustic soda ingestion.

At presentation anamnestic data, demographic characteristics and initial signs and symptoms correlated to ingestion were gathered.

During the first 48 hours from ingestion gastro-oesophageal and laryngeal damages were investigated with endoscopy and video-laryngoscopy in 27 patients.

In the following period, 18 over 27 patients underwent general anaesthesia with EIT for a surgical procedure. Data collection on airway management has been performed from international anaesthesiologist.



RESULTS

A total of *27 children* (average age 38 months) with a recent caustic soda ingestion were enrolled in the study.

Drooling of saliva was the most common symptom at presentation *(92,6%)*, whereas lip *(88,9%)* and tongue *(81,5%)* burns were the main signs at the initial oral evaluation.

First pass success rate was *72,2%*, whereas the rate of failed ETI was *5.5%*. The overall frequency of perioperative airways adverse events was *66% (bronchospasm, 55%; laryngospasm, 38,9%; desaturation, 27,8%; and bradycardia, 16,7%)*.

Laryngeal damages were presents in *75%* of our patients in the form of laryngeal oedema *(62,5%)* or burn *(25%)*, laryngeal bleeding *(20,8%)* or damaged epiglottis *(8,3%)*. Tracheostomy or eFONA were never performed, whereas ICU admission was needed in *14,8%* because of respiratory distress.

AIRWAY MANAGEMENT	*TOTAL (N=18)*
FIRST PASS SUCCESS RATE; %(N)	72,2% (13)
FAILED ENDOTRACHEAL INTUBATION; %(N)	5,5% (1)
PERIOPERATIVE RESPIRATORY COMPLICATIONS:	66% (12)
LARYNGOSPASM; % (N)	50% (9)
BRONCHOSPASM; % (N)	55% (10)
BRADYCARDIA ; % (N) HEART RATE < 80 < 2-YEARS-OLD, < 60 > 2-YEARS-OLD	16,6% (3)
DESATURATION; % (N) SPO2 <90% FOR > 45 SECONDS	27,7% (5)

VIDEO-LARYNGOSCOPIC EVALUATION	*TOTAL (N=27)*
OVERALL LARYNGEAL INJURIES	77,7% (21)
LARYNGEAL OEDEMA; % (N)	66,6% (18)
LARYNGEAL BURN; % (N)	22,2% (6)
LARYNGEAL BLEEDING; % (N)	18,5% (5)
SCARRED EPIGLOTTIS; % (N)	7,4% (2)

CONCLUSIONS

These data clearly confirms that caustic soda ingestion increases difficulties at intubation in paediatric patients and cause significant damages to laryngeal structures.

To this moment, there is little correlation in literature between caustic ingestion and difficult acute airway management.

Compared to gastroesophageal damages, laryngeal damages are often put aside in current reports.

This preliminary study opens the way to further investigations into this specific and almost only paediatric pathology typical of LMICs from an anaesthesiologist point of view

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