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Tracheostomy Clinical Summaries

Atos

Adoption and Utilization of Heat and Moisture Exchangers (HMEs) in the Tracheostomy Patient

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Background

- A tracheotomy results in the loss of upper airway humidification which may compromise pulmonary health causing thicker secretions, mucus plugging, tracheal mucosa irritation, and respiratory distress
- Standard practice to address humidification deficits following a tracheotomy has been the use of a conventional external humidification system (CEHS)
- CEHS may be complicated, costly, and restrict patients' mobility
- Heat and Moisture Exchangers (HMEs) have been shown to improve pulmonary health, patient satisfaction, and quality of life in laryngectomized patients
- Literature regarding HME use in spontaneously breathing, non-ventilated tracheostomized patients is limited
- A Quality Improvement (QI) project evaluated HME use in this patient population and potential cost savings
- The TrachPhone HME was chosen for the project given its multiple device features including the speaking function, suction port, oxygen connector, and hygroscopic foam

Objective

Evaluate the feasibility and efficacy of HME use in post-operative tracheostomy patients in the hospital, measured primarily through nursing feedback and assess projected cost savings compared to CEHS

Design and methods

- QI project with intention of improving care processes and cost benefits
- Conducted at Stanford University between Feb-Sept 2022
- Prior to project initiation, a One Point Lesson (OPL) form was created with nursing education and training, care flow-charts, and discharge plans
- Included were 71 non-mechanically ventilated tracheostomized patients from the otolaryngology ward using CEHS
- Excluded were head and neck cancer patients requiring regional or free flap reconstruction
- Patients were switched from CEHS to TrachPhone HMEs when transferred to inpatient unit
- Data collected through a project specific nursing survey, gathering information on nursing perception of HME use compared to CEHS
- Cost analysis of single CEHS setup vs. HME packages as well as projected annual cost savings were calculated

AT A GLANCE

Study Design

- Institutional QI project
- Pre-project training and education of nursing staff via a One Point Lesson (OPL) form
- Over 9 months, 71 patients were recruited and switched from CEHS to TrachPhone HMEs
- Distribution and completion of nursing survey, nursing feedback

Outcome parameters

- Nurse-perceived efficacy: HME tolerance and overall preference, assessed through survey
- Patient impact assessed through nursing notes
- Cost analysis of HME use compared to CEHS

Key points

- The QI project concluded that use of TrachPhone HMEs compared to CEHS offered several advantages to patients and healthcare providers, which increased patient and provider satisfaction
- Zero patients developed respiratory distress, mucus plugging, or air trapping during the QI project
- HMEs were reported to be easier to set up, maintain, and educate on; improved patient's mobility; decreased noise in the patient's room; increased patient's ability to communicate; and decreased suction requirements
- Considerable cost savings, both calculated and projected, of using TrachPhone HMEs compared to external humidifiers

Reference

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Results

HME Tolerance and Preference

- 97% (69/71) of patients tolerated TrachPhone HME immediately post-op, 3% of patients (2/71) did not tolerate the HME due to elevated tracheostomy suctioning needs
- None of the patients (n=71) developed respiratory distress, air trappings, or mucus plugs
- 89% (24/27) nurses preferred TrachPhone HME over traditional CEHS for humidification of inhaled air
- From nursing feedback, reasons for preferring TrachPhone HME (based on n=24) were: improved patient mobility (100%, n=24), decreased noise in the patient's room (96%, n=22), ease of set-up (75%, n=18), decreased maintenance (50%, n=12), increased patient communication (50%, n=12), less training for patients and caregivers (46%, n=11), and decrease in suction requirements (42%, n=10)
- From nursing feedback, negative impressions of TrachPhone HME were: occasional obstruction with mucus leading to replacement (55%, n=15), and device disconnection, lack of patient tolerance, and supply chain access issues (3.7%, n=1, for all)

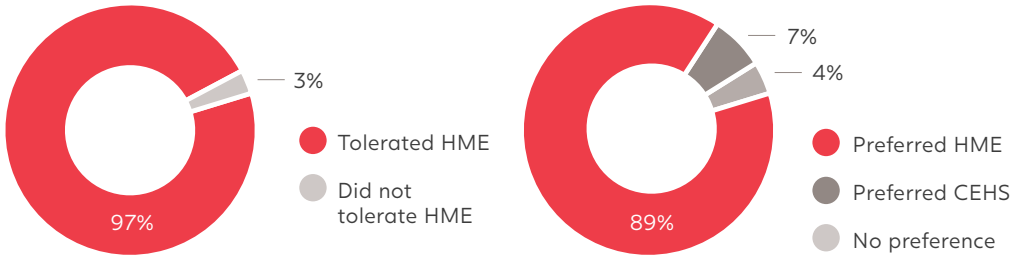

Figure 1.

A) 97% (69/71) of patients tolerated the TrachPhone HME immediately post-op, B) 89% (24/27) nurses preferred the TrachPhone HME over traditional CEHS for inhaled air humidification

Projected Cost

- Inpatient cost of CEHS setup $7.17 vs TrachPhone $3.40
- Monthly outpatient cost – CEHS $307.50 vs. TrachPhone $102.00 (67% cost saving, based on 1 HME/day)
- Projected annual cost reduction was $68,000 (based on projected annual 325 tracheostomy procedures, based on 1 HME/day, in the USA)

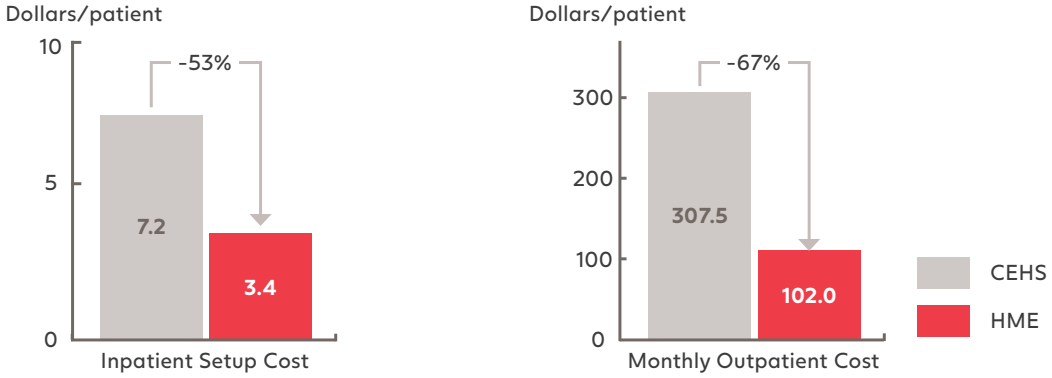

Figure 2.

Cost analysis of CEHS compared to HME use. A) Inpatient setup cost is 53% less for HMEs compared to CEHS, and B) monthly outpatient cost is 67% lower with HMEs compared to CEHS

Conclusions

- The QI project indicated that use of HMEs in tracheotomized patients, compared to CEHS, presented no complications, and simplified the postoperative care process to both patients and nurses
- Main benefits of HME use over CEHS were: nurse preference and increased satisfaction, and potential substantial cost savings to patient and institution
- Initial resistance to changes in ingrained care processes were alleviated with education, focused training, and positive outcomes