

RESEARCH ARTICLE

Improving tracheostomy care: collaborative national consensus and prioritisation of quality improvements in the United Kingdom.

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Abstract

Background

Tracheostomies are artificial airway devices used predominantly to manage airway obstruction and to facilitate weaning from prolonged mechanical ventilation. Whilst a lifesaving procedure, tracheostomy can also lead to significant morbidity and mortality. Associated vocalization and swallowing problems lead to anxiety for patients, families and healthcare staff. The Global Tracheostomy (Quality Improvement) Collaborative can improve the safety and quality of care in participating institutions, leading to a large-scale UK-wide evaluation. However, whilst individual strategies have proved effective in single centres, it is unclear which tracheostomy quality improvement program elements should be prioritized in the UK's National Health Service's (NHS) diverse hospitals.

Aims

Through a unique consensus and prioritisation exercise using front line staff and leaders from 20 participating UK hospitals, we aimed to develop a national strategy for tracheostomy quality improvements.

Methods

Following national research ethics committee approval, representative multidisciplinary staff groups were interviewed and completed bespoke questionnaires regarding their experiences of tracheostomy care and associated quality improvements. Qualitative evaluation techniques were applied to develop key themes, further refined by group consensus and prioritisation exercises, creating a ranked list of important quality improvement interventions that should be implemented.

Results

Thematic analysis yielded 22 statements regarding tracheostomy care. Highly ranked priority interventions included multidisciplinary staff education, standards and competencies, multidisciplinary ward rounds, equipment standardisation and structured care bundles.

Conclusion

Prioritising distinct quality improvement interventions will allow providers to focus on improving the quality and safety of tracheostomy care using resources and strategies that are important to frontline healthcare staff.

1. Introduction

A tracheostomy is an artificial airway created in the front of the neck, with approximately 15,000 new adult and paediatric tracheostomies performed annually in England and Wales.¹ Temporary tracheostomies are most commonly performed to facilitate weaning from prolonged ventilation in the critically ill or for the surgical management of upper airway problems, including the classical indication of actual or threatened airway obstruction. Whilst potentially a lifesaving procedure, tracheostomy can also lead to significant morbidity and mortality, described in a number of national reports. Around five percent of all airway incidents reported to the National Patient Safety Agency (NPSA) involved tracheostomies, with 26% of these incidents classed as major or life threatening.^{2,3} The fourth National Anaesthesia Audit Project (NAP4)

detailed serious airway-related complications.⁴ Over half of all airway-related deaths and cases of hypoxic brain damage occurring in the critically ill were attributed to tracheostomy problems. The National Confidential Enquiry into Patient Outcome (NCEPOD) tracheostomy report detailed over 2,500 new tracheostomy insertions.¹ This report identified that 74% of cases analysed in detail had room for improvement in both clinical and organisational care, with 2% receiving less than satisfactory care. Following patterns in previous reports, 23.6% of tracheostomy patients managed in critical care units and 31.3% of ward-based patients suffered a tracheostomy-related complication.

Many of the causes of harm are potentially preventable. Examples include a lack of staff training, lack of appropriate equipment provision for routine and emergency care, fragmented and

uncoordinated multidisciplinary care, a lack of data and a lack of leadership. The quality of care can also be improved for tracheostomy patients. Associated vocalization and swallowing problems lead to anxiety for patients, families and healthcare staff and can have detrimental effects on treatment compliance and engagement.

Many of the underlying issues are amenable to prospective quality improvement strategies which have been shown to improve the safety and quality of care in individual institutions.⁵⁻⁸ The Global Tracheostomy (Quality Improvement) Collaborative (GTC) was established in 2012 and brings together expertise and resources to guide participating sites, with outcomes tracked by a bespoke patient-level database. Participation in the GTC program has been shown to significantly reduce harm, reduce length of stay, and improve surrogate indicators for the quality of care in four diverse UK hospitals.⁵ However, when considering adopting quality improvement strategies into diverse hospitals and institutions, it is unclear

which tracheostomy program elements should be prioritized. Through a unique consensus and prioritisation exercise using front line staff and leaders from 20 participating UK hospitals, we aimed to develop a national strategy for tracheostomy quality improvements. Our qualitative aims included investigating the experiences and perceptions of staff and key stakeholders within the implementation sites, capturing contextual issues that may influence the effectiveness of improvement interventions.

2. Methods

The protocol for this study was approved by the National Research Ethics Committee (IRAS 206955) as part of the UK-wide Improving Tracheostomy Care (ITC) project, funded by the Health Foundation and supported by the Royal College of Anaesthetists. Semi-structured one-to-one qualitative interviews were conducted by four of the authors (MF, BAM, JL, BC) with multidisciplinary staff who consented to participate in our project. Semi-structured questions are detailed in Table 1.

Table 1. Semi-structured one-to-one qualitative interview questions and Appreciative Inquiry questions asked to front line multidisciplinary healthcare staff. ITC – Improving Tracheostomy Care.

Interview questions

1. What are your general hopes and fears (feelings/opinion) about this hospital's participation in the ITC programme?
2. What barriers do you anticipate in this improvement work?
3. Have you worked out any tactics for seeing this work through (to get around these barriers)?
4. Are you able to tell me a story about when something went right in the safe management of tracheostomy?

5. Are you able to tell me a story about when something went wrong in the management of tracheostomy?
6. Would you like to tell me anything else in terms of your opinions or feelings towards this improvement programme?

Appreciative Inquiry questions

1. What is particularly good about tracheostomy care in your service?
2. What quality concerns do you have about the way tracheostomy care is currently delivered?
3. What do you think could be improved?
4. What have you tried in the past? Did it work? If not why not?
5. How do you think it could be improved now?
6. Comments and observations.

Anonymous transcripts were made from the recordings, which underwent thematic analysis⁹ and short statements were constructed that reflected the high-level emerging themes. Appreciative Inquiry (AI) forms were also completed by interviewees, collecting anonymised and unstructured responses to semi-structured questions (Table 1). Responses recorded on the AI forms also underwent thematic analysis.

A collaborative consensus and prioritisation setting meeting of site leads, frontline multidisciplinary clinical staff and patients was hosted by the Royal College of Anaesthetists, London, on 25th November 2016. Participants representing the 20 ITC sites were split into five focus groups and asked to consider in detail the following high-level themes that emerged from thematic analyses:

1. What tracheostomy-specific improvements have you tested or

are planning to test at your institution?

2. What local factors have prompted you to join the ITC and to start interventions and improvements?
3. What constraints have you experienced and what have you done to try to overcome these barriers?
4. What does the ideal training in tracheostomy care look like? What resources do we need to deliver these?
5. What is the ideal Tracheostomy Multidisciplinary Team and what should they do?

The outputs of these focus groups were added to existing statements that had arisen from the thematic analysis from the interviews, constructing 22 'Dotmocracy' idea rating sheets. Dotmocracy is an established facilitation method used to

describe ‘voting by stickers’.^{10,11} Each sheet contained one of the statements along with a 5-point Likert scale, bounded by strong agreement, through neutral to strong disagreement. Participants were given enough sticky dots to vote once on each of the 22 boards. Participants were also asked to indicate the priority of individual statements in their own practice by indicating whether this activity was one in which they were already doing, planned to do, or did not plan to undertake. Participants viewed the sheets in random order and were instructed to vote on all

sheets individually once, but this was not enforced. Images of the completed sheets were photographed and later analysed. An example is shown in Figure 1.

A weighting was applied to the Likert scales: +2 points for strong agreement, +1 agreement, 0 for neutral, -1 for disagreement and -2 for strong disagreement. The overall score could therefore be positive or negative. Total votes without weighting were used for the prioritisation scoring. No further statistical analysis was undertaken for this qualitative exercise.

The image shows a completed 'Dotmocracy' rating sheet for the statement 'Emergency algorithm simulation training'. The sheet is titled 'This can be improved now?' and includes logos for 'Improving Traumaology Care' and 'The South Yorkshire Partnership NHS Foundation Trust'. The main heading is 'Emergency algorithm simulation training'. Below this is a Likert scale titled 'Do you agree?' with five categories: 'Strong Agreement' (smiley face), 'Agreement' (neutral smiley face), 'Neutral' (neutral face), 'Disagreement' (neutral sad face), and 'Strong Disagreement' (sad face). A sixth category, 'Confusion' (question mark), is also present. The instruction 'put one dot below & tick on the right' is written above the scale. The 'Strong Agreement' category has 10 colored dots (red, yellow, green, blue) placed below it. The 'Disagreement' and 'Strong Disagreement' categories have 10 dots each. The 'Confusion' category has 10 dots. To the right of the scale are three sections: 'Already doing or partially doing' (10 dots), 'Plan to do' (10 dots), and 'No Plan to do/Not applicable' (10 dots). Below the scale are two sections for comments: 'Strengths & Opportunities comments' and 'Concerns & Weaknesses comments'. A large blue '70' is written in the bottom center of the sheet.

Figure. 1 Example of a completed ‘Dotmocracy’ rating sheet identifying the importance of emergency algorithm simulation training

3. Results

Thirty-nine multidisciplinary staff completed initial 1:1 semi-structured interviews, lasting between 6 and 17 minutes, with these staff also completing the AI forms (Table 2). Thematic analysis

of interviews yielded 16 statements regarding tracheostomy care (statement numbers 1-16, listed in Table 3), with an additional six themes arising from analysis of AI work cards refined by the focus groups (statement numbers 17-22).

Table 2a. Summary of staff by role and speciality involved in AI and interviews

Base speciality	Total n=39	Role of participating staff				
		Nurse	Doctor	Physiotherapist	SLT	Tutor / Educator
Anaesthesia	4	0	4	0	0	0
Head & Neck Surgery	7	6	1	0	0	0
Intensive Care	26	8	12	3	0	3
Critical Care Outreach	2	2	0	0	0	0

Table 2b. Summary of staff by role and specialty involved in focus groups at consensus and prioritisation meeting.

Base speciality	Total n=48	Role of participating staff				
		Nurse	Doctors	Physiotherapist	SLT	Tutor / Educator
Anaesthesia	4	0	4	0	0	0
Head & Neck Surgery	11	7	2	1	1	0
Intensive Care	24	6	9	3	6	0
Resp. Medicine	3	1	2	0	0	0
Neonatal	1	0	1	0	0	0
Paediatrics	2	2	0	0	0	0
Other	3	0	0	0	0	3

Ranking these themes by agreement score showed that educational objectives had the highest levels of agreement (Table 3). Developing competencies and standards, driven by mandatory emergency management training were the statements with the highest agreement scores. Statements around multidisciplinary care also produced high agreement scores, with tracheostomy MDT ward rounds, equipment standardisation, structured care bundles all scoring highly, supporting a desire to reduce variation in care provided in different locations. Data capture to measure progress and adverse incident reporting mechanisms contributed to

monitoring systems also producing high agreement scores.

Rankings of interventions that participants were already undertaking and those that they intended to implement followed similar patterns to the agreement scores, especially when combining these two categories (Table 3). There was an almost inverse relationship between agreement scores and rankings of those interventions that participants did not plan to introduce in their institutions, demonstrating an unwillingness of sites to implement interventions that were perceived of low priority.

Table 3. Proposed interventions ranked by agreement scores, pooled from weighted Likert scales. ‘Doing & Planning to do’ represents an aggregate score of those interventions that participants were either already doing or planned to do. Abbreviations: SLT – Speech & Language Therapy; ACV – Above Cuff Vocalisation; MDT – Multidisciplinary Team; ITC – Improving Tracheostomy Care; FEES – Fibreoptic Endoscopic Evaluation of Swallow.

Rank	Statement Number	Intervention	Agreement score	Doing & Planning to do	No plans to do
1	6	Mandatory for wards that receive trachy patients	80	38	3
2	7	Establish competencies and standards/accreditation for training	78	41	3
3	10	Establish MDT trachy team to review all trachy patients regularly	75	34	5
4	9	Emergency algorithm simulation training	70	40	0
5	14	Capture data to inform improvement areas and measure progress	66	37	0
6	5	Reduce variation in location-based standards of care	65	35	3
7	18	Monitor adverse incidents and highlight these to Trust board level	63	38	0
8	20	Standardise tracheostomy equipment around a hospital	59	36	2
9	8	Establish trachy link nurses in trachy wards	57	29	9
10	15	Tracheostomy care bundle / standard operating procedures	57	33	6
11	1	Standardise a pathway for patients discharged into the community	48	20	15
12	21	Take tracheostomy training to the ward and emergency department staff	46	31	7
13	22	Outline evidence to quantify the potential savings of ITC participation	46	25	11
14	2	Improve time to vocalisation (SLT involvement)	43	24	10
15	13	Improve cuff deflation and weaning procedures /strategies	38	31	5
16	4	Establish/access online and multi-media training resources	34	30	9
17	11	Establish admission alert for patients with pre-existing trachy	34	34	8
18	12	Improve patient and family training/involvement	32	33	7
19	3	Improve time to swallowing	31	18	13
20	16	Designated cohort wards	29	31	9
21	17	Portable FEES available to critical care patients	14	12	18
22	19	Medical leadership is not always needed in tracheostomy MDT	4	9	17

4. Discussion

Following detailed interviews and enquiries around current NHS tracheostomy care, our project has summarised the key issues that face front line staff when considering implementing change and quality improvements in the management of tracheostomy patients. Furthermore, novel consensus and prioritisation tools have informed which interventions should be implemented and in what order. This study will be of benefit not only to the participants of the ITC project but to all those charged with making improvements to tracheostomy care.

The highest priority topics involved training; implementing mandatory training for all staff on wards receiving tracheostomy patients, simulation training for emergencies, and ensuring training is accredited. These priorities may reflect the 2014 UK NCEPOD 'on the right trach' report which made training in emergency management a key recommendation for UK hospitals.¹ However, there may also be a local recognition that many adverse events can be prevented by early detection of potential problems through a well-trained bedside workforce.^{5,12}

The NCEPOD report also made key recommendations regarding MDT tracheostomy teams and considered these to be examples of best practice. Our results indicate that UK hospitals were either already using MDT tracheostomy teams or were planning to do so. However, not all the NCEPOD recommendations were reported as high priority. Access to Speech and Language Therapists (SLT) and FEES can have a positive impact on communication, vocalisation and swallow in tracheostomised patients,¹³ but these were not considered high priority, and were poorly implemented by sites at this baseline evaluation. This may reflect a national

shortage of SLTs and variable access to critically ill patients across the country.¹³

Interestingly, although having designated tracheostomy 'cohort' wards was not considered a high priority, this intervention was already being implemented in many hospitals. Concentrating trained staff, equipment and resources may have advantages for education, maintenance of equipment stock levels and translate into improved patient safety.⁵

There are many potential barriers to successful quality improvement projects in our complex hospital systems. Behavioural attitudes of some staff, unwillingness to engage at a junior and senior level, and misconceptions about the relevance of a particular program are frequently reported.¹⁴ For a project to be successful, it is vital to focus on the priorities of the bedside staff charged with implementation. Caregivers are much more likely to engage if they agree with the intervention content and perceive each stage of implementation to be an important factor in delivering better or safer patient care, and this goes beyond simply providing 'evidence' that certain practices are likely to improve care.^{15,16} Mechanisms to facilitate successful implementation include creating a community with a common purpose and a desire to conform to isomorphic pressures (conforming to group norms)¹⁶ and by harnessing commitment and consensus around the need to improve.¹⁴⁻¹⁶ Perceived early successes in a project can also be a powerful driver to stimulate interest and engagement amongst colleagues, making clear, realistic and achievable outcomes a priority for interventions. Although all proposed interventions that arose from our initial analyses are important in tracheostomy care, focussing on all them at outset could dilute those considered as top priority. By developing an evidence based strategy and determining a priority by

consensus amongst a community of experts and front-line healthcare staff, who represent the same staff cohort who will lead and deliver these interventions, or aim is to make tracheostomy quality improvements seem achievable, relevant, and a priority for participating sites.

One of the potential limitations of our approach is that the participants in the initial interviews and appreciative enquiry represent sites which are committed to improving tracheostomy care. There are likely many different motivations for sites to join our project ranging from personal clinical interest, regulatory or compliance concerns, or a response to adverse clinical incidents. Similarly, the prioritisation exercise was undertaken by an equally motivated group, although the variety of sites, specialities and clinical roles of participants reflects the diverse multidisciplinary nature of staff who manage neck breathing patients in the UK. The list of potential interventions and their priority was determined by qualitative and consensus methodologies which are open to selection bias, as many staff participated in both intervention selection and the prioritisation exercise. Thematic analysis may not have identified all key points, and although dotmocracy (voting with stickers) has been used successfully in other prioritisation studies,¹¹ there are potential limitations, including the 'bandwagon phenomenon' in which participants place their stickers where others have voted. However, given the wide range of contextual responses to our initial enquiries, we believe that these methodologies were effective in identifying interventions and in achieving consensus.

5. Conclusion

This project has allowed us to generate the first national prioritised list of interventions, created by a representative

multidisciplinary group using comprehensive enquiries, with the aim of improving the quality and safety of tracheostomy care throughout the NHS. Prioritising distinct quality improvement interventions will allow providers to focus on improving the quality and safety of tracheostomy care using resources and strategies that are important to frontline healthcare staff. Whilst this consensus view was informed by twenty UK sites, the multidisciplinary nature and positions of those represented makes this prioritisation exercise likely relevant to the wider NHS, and potentially beyond.

Conflicts of interest

None of the authors have any relevant conflicts of interest to declare.

BAM is chair of the UK National Tracheostomy Safety Project, European Lead of the Global Tracheostomy Collaborative and Tracheostomy Lead Clinician for NHS England, but does not believe that these roles represent a conflict of interest.

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