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RESEARCH REPORT

Worth a try or a last resort: Healthcare professionals' experiences and opinions of above cuff vocalisation

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Abstract

Background: Above cuff vocalisation (ACV) involves the application of an external flow of air via the subglottic port of a tracheostomy. ACV can facilitate vocalisation and may improve swallowing and quality of life for patients with a tracheostomy. A recent systematic review highlighted the limited evidence available for the acceptability, effectiveness, safety or optimal implementation of ACV.

Aims: To explore the experience of healthcare professionals (HCPs) using ACV and their perceptions of best practice.

Methods and Procedures: Semi-structured interviews were conducted with a range of HCPs with experience using ACV. Topics included: experiences with ACV, management of ACV, opinions about ACV, impact of COVID-19, future directions for ACV and impact on length of stay. Interviews were conducted online from December 2020 to March 2022. Data were analysed using reflexive thematic analysis.

Outcomes and Results: Twenty-four HCPs were interviewed from seven countries and five professional groups. Four interconnected themes were developed: (1) moral distress amplifying the need to fix patients; (2) subjectivity and uncertainty leading to variations in practice and purpose; (3) knowledge and experience leading to control and caution; and (4) worth a try or a last resort. Theme four contained three sub-themes: (a) part of the toolbox; (b) useful but limited tool; and (c) following the patient's lead. The moral distress experienced by HCPs and their essential 'need to fix' patients seems to underpin the varied opinions of ACV. These opinions appear to be formed primarily on the basis of experience, because of the underlying subjectivities and uncertainties. As knowledge and experience with ACV increased, and adverse events were experienced, most HCPs became more cautious in their approach to ACV.

Conclusions and Implications: More research is needed to reduce the subjectivities and uncertainties surrounding ACV. The implementation of standardised procedures, processes, and competencies may help to reduce the frequency of adverse events and support a more controlled approach. Widening the focus of the purpose of ACV to include swallowing may help to maximise the potential benefits.

KEYWORDS

above cuff vocalisation, communication, deglutition disorders, dysphagia, interview, qualitative, tracheostomy

WHAT THIS PAPER ADDS

What is already known on the subject

- There is limited and low-quality evidence for above cuff vocalisation (ACV) and clinical application and practice varies substantially. However, the reasons for this variation in practice and healthcare professionals' (HCPs') opinions of ACV were unclear.

What this study adds

- HCPs' experiences and opinions of ACV vary as a result of the uncertainty and subjectivity surrounding ACV compounded by their personal experiences with it. A need for caution also appears to emerge as HCPs become more familiar and experienced with using ACV.

What are the clinical implications of this work?

- Implementing standardised procedures, safety processes and competencies may help to compensate for the uncertainty and subjectivity surrounding ACV and may reduce the frequency of adverse events. Widening the focus of purpose of ACV, including swallowing in addition to communication, may increase the number of potential candidates and increase the potential benefits of ACV. Using multidisciplinary team (MDT) simulation training for ACV competency development might help to improve MDT working and ACV implementation.

INTRODUCTION

There are a variety of negative consequences for patients receiving a tracheostomy. Patients with a tracheostomy typically have the tracheostomy cuff inflated for a prolonged period, and the lack of air flow through their laryngo-pharynx means that patients are unable to vocalise and can lead to laryngo-pharyngeal desensitisation and dysphagia (Sasaki et al., 1977; Siebens et al., 1993; Skoretz et al., 2020; Wallace & McGrath, 2021). Difficulties communicating and swallowing can have a serious impact on patients' quality of life (QoL; Freeman-Sanderson et al., 2018; Newman et al., 2022; Rose et al., 2014). Early interventions which seek to restore laryngo-pharyngeal air flow are believed to be important to reduce the impact of a tracheostomy on communication and swallowing and help to improve QoL (Wallace et al., 2022). The primary method for laryngo-pharyngeal air flow restoration involves deflation of the tracheostomy cuff. This can be used in isolation to facilitate leak speech or ventilator-adjusted leak speech, which allows some air flow to pass through the larynx, or in combination with a one-way valve, which redirects all air flow through the larynx (Mills et al., 2023; Zaga et al., 2019, 2023).

Some tracheostomy tubes have a subglottic port, a small tube that has an exit above the tracheostomy cuff. This subglottic port is primarily used to aspirate secretions that can accumulate above the cuff (McGrath, 2021). In some intensive care units (ICUs) subglottic tracheostomy tubes are inserted as the first tracheostomy tube for most patients, as subglottic secretion drainage has been shown to reduce the risk of ventilator-associated pneumonia and mortality (Pozuelo-Carrascosa et al., 2020; Terragni et al., 2020). In other ICUs, standard tracheostomy tubes are changed for subglottic tracheostomy tubes either for secretion management or for potential vocalisation opportunities for specific patients (Pandian et al., 2020).

Above cuff vocalisation (ACV), also known as 'talking tracheostomy' and 'external subglottic air flow', involves the application of an external air flow via the subglottic port of the tracheostomy tube, which exits above the inflated cuff and passes through the vocal folds (Kothari et al., 2017; McGrath et al., 2016, 2019; Petosic et al., 2021). A systematic review of the ACV literature highlighted that there is limited, and low-quality evidence available for ACV, and the application of ACV was also shown to be highly variable (Mills et al., 2022b). An international online survey of healthcare professionals (HCPs) confirmed that there has been limited uptake of ACV and there is a lack of a standardised approach to the implementation and use of ACV (Mills et al., 2022a). Both the systematic review and the survey suggest that this restoration of laryngopharyngeal air flow during ACV offers potential benefits for swallowing, saliva management, cough, communication and QoL (Mills et al., 2022a, 2022b; Pandian et al., 2020). However, the survey demonstrated that there was considerable variability in the perceived degree of benefit and optimal approach to application (Mills et al., 2022a). It is likely that the limited supporting evidence for ACV and the variation in application observed in the research are contributing to the variations in clinical practice reported by HCPs. The primary aim of this study was to explore the experience of HCPs using ACV and their perceptions of best practice. Improved understanding of HCPs opinions of ACV will help to optimise implementation and application and improve patient outcomes.

METHODS

This study employed a qualitative interview design. Ethical approval was obtained from the School of Medicine Research Ethics Committee at the University of Leeds (05/02/2019/MREC 18–037). Data are reported according to the Consolidated Criteria for Reporting Qualitative Studies (COREQ) (Tong et al., 2007) (Supporting Information File 1).

Participants

Target participants were HCPs with direct experience in the assessment or delivery of ACV. A range of participants were sought, specifically participants from a range of countries, with differing experience levels, from different professional groups, and with experience with different patient groups. Participants were recruited in three ways: (1) respondents from a survey (Mills et al., 2022a) who stated they would be interested to participate in an interview, (2) critical care networks, and (3) advertisements on social media. All participants completed a consent form after reviewing a participant information sheet.

Sampling

Purposive sampling was employed to include a range of participants with direct experience of ACV with different patient populations, from different professional groups and countries and with different experiences levels (Bhardwaj, 2019). Sample size was determined based on ongoing and iterative analysis of the data and pragmatic decisions about the richness and depth of the data set and its sufficiency to allow the research questions to be answered (Braun & Clarke, 2021b; O'Reilly & Parker, 2013), as is typical for reflexive thematic analysis (Clarke & Braun, 2022).

Data generation

Interviews were semi-structured using a topic guide (Supporting Information File 2) which was developed from information gathered from a systematic review (Mills et al., 2022b) and a survey (Mills et al., 2022a). Topics included experiences with ACV, management of ACV, opinions about ACV, impact of COVID-19, future directions for ACV and impact on length of stay. The topic guide was piloted with four participants, and minor revisions were made after each interview. Interviews were conducted online over the course of 16 months, from December 2020 to March 2022. Interviews were audio recorded and transcribed.

Data analysis

Data were analysed using a reflexive thematic analysis, using the six-phase process outlined by Braun and Clarke (Braun & Clarke, 2006). These six- phases included (1) data familiarisation; (2) initial code generation; (3) generating themes; (4) reviewing potential themes; (5) defining and naming themes; (6) producing the report (Braun & Clarke, 2006, 2012). Reflexive thematic analysis is a subjective approach that incorporates the view and position of the researcher, the data and wider context of the research (Braun & Clarke, 2019, 2021a). Reflexivity and the critical reflection on the personal position of the researcher and how this influences the knowledge produced are essential components of reflexive thematic analysis (Clarke & Braun, 2022; Finlay, 2002; Le Gallais, 2008). The meaning and meaningfulness of participants' experiences and opinions of ACV are central to the analysis (Byrne, 2022). Data relevant to the research questions were coded inductively using descriptive and latent codes. The key themes were developed and refined by the first author, with wider consultation with the research team. Themes were designated as key, dependent on a combination of different factors including: the frequency of occurrence, and the importance of the information they captured in relation to the research questions (Braun & Clarke, 2006; Ryan & Bernard, 2003). NVivo version 1.6.1 (QSR International) was used to manage the data and support analysis.

RESULTS

Twenty-four HCPs were interviewed about their experiences and opinions of ACV. Data generation ceased after the 24th participant; at this point a relatively diverse group of participants had been recruited and the data set was rich enough to facilitate reflexive thematic analysis (Braun & Clarke, 2021b). Participants were from seven different countries and from five different professional groups (Table 1). Interviews ranged in duration from 17 to 61 min (mean: 35 min).

Four interconnected themes were developed from the reflexive thematic analysis of the data, with three subthemes related to the fourth theme (Figure 1).

Theme 1: Moral distress amplifying the need to fix patients

Some participants described their experiences of moral distress. Moral distress is the psychological or ethical unease experienced by HCPs when they cannot provide patients with appropriate care because of factors outside of their control (Sanderson et al., 2019). These experiences seemed to amplify their underlying feeling of needing to fix their patients:

> '…it's so hard because you're just like: I wish I had a fix. […] I feel…like I've let patients down a lot, but not through any fault of not trying […] I hate feeling like we can't make a difference purely because we don't have a magic wand sometimes'. [speech-language therapist (SLT) 7]

HCPs reported various intrinsic drivers to the 'need to fix' patients. Some participants described feeling helpless in their efforts for patients, with a willingness to try anything, rather than feeling like they are doing nothing:

> 'That's mostly the feeling 'what can we do?' and using the ACV well, then we try to do something…it might not help all patients, but we try and do something'. [occupational therapist (OT) 1]

Participants also reported extrinsic pressures to fix patients such as, managers pressuring staff to progress patients or from patient behaviours. A variety of barriers to providing ACV were reported to exist including potential side-effects, structural or process barriers and staffing issues. These barriers can lead to HCPs feeling upset, burdened, frustrated and guilty; but this can also lead to increased persistence in the desire to provide ACV and contribute to improving the patient's QoL:

> '…so we have to be like strategic as to like when we place it [consider the likelihood of patient transfer when deciding whether to insert a subglottic tube]. And sometimes they make us like take it [subglottic tube] out! Which is […] it's cruel and horrible and I think just stupid. But that's, you know, we're trying to deal with that'. [SLT 5]

> 'And I work with people who really want to give it a go now because their patients are dying to speak and I work with people, and probably my own practice is, [sigh] actually if in a couple of days we're gonna get this cuff down this is quite a big time commitment for us to go and do this and supporting the nurse to do it […] So then I feel like maybe we don't need to do this now. But then I also feel a bit bad about that as well…sometimes. I think if we were better resourced, we'd have a different take on it for sure'. [SLT 1]

At the other extreme of moral distress, positive experiences with ACV can influence the need to fix patients, with one positive experience with ACV incentivising the team to widen implementation:

> '…when we put the air in, they both communicated. They both cried. They both shared

TABLE 1 Sample characteristics ($N = 24$).

Professional group	Speech and language therapist (13), physiotherapist (8), advanced critical care practitioner (1), nurse (1), occupational therapist (1)
Country	United Kingdom (12), Australia (5), Norway (2), United States (2), Denmark (1), Greece (1), Ireland (1)
Gender	Female (20), Male (4)
Number of years practising clinically	Median: 19.5 years Range: 8–30 years
Number of years using ACV	Mean: 5 years Range: 0.5–16 years
Patient population	The majority of participants used ACV in the ICU population. However, some participants also used ACV in other patient populations, for example, neurology, neurosurgery, respiratory, spinal, cardiothoracic, long-term/home ventilation and weaning, stroke, medical, post-surgical, general acute. Two participants only used ACV with the non-ICU population.
Brand of tracheostomy tube used for ACV	Portex Blue Line Ultra Suctionaid (15), TRACOE twist (3), Portex Blue Line Ultra Suctionaid and TRACOE twist (5), Shiley Evac (1)
Type of air flow used	Oxygen (8), oxygen or humidified oxygen (1), medical air (4), oxygen or medical air (7), humidified medical air (2), unknown (2)
Method of air flow delivery	Intermittent using a thumb port (14), using a thumb port but holding the port closed continuously (1), continuous (6), both continuous and intermittent but predominantly intermittent (1), both but predominantly continuous (2)

Abbreviations: ACV, above cuff vocalisation; ICU, intensive care unit.

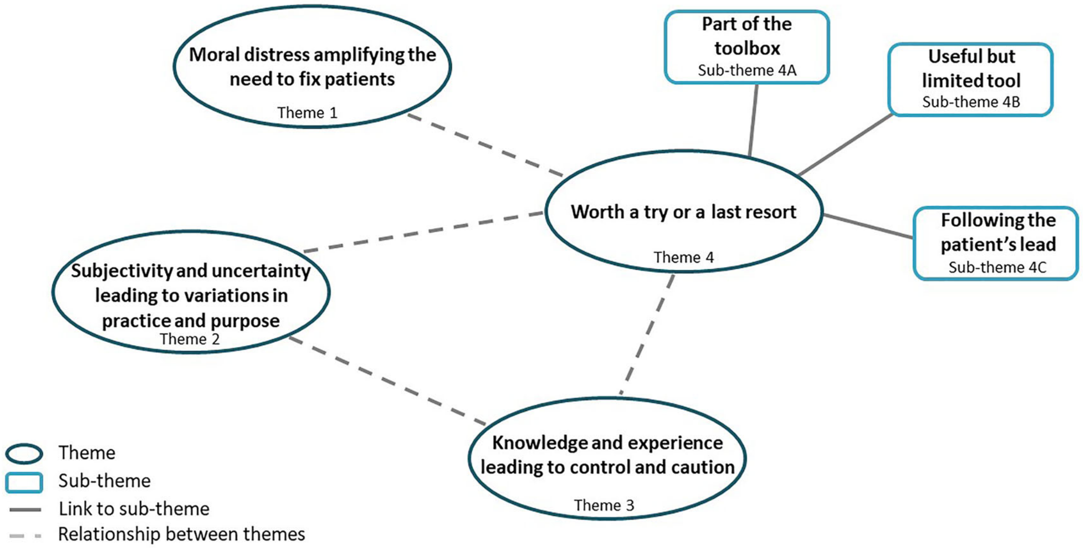

FIGURE 1 Thematic map. [Colour figure can be viewed at wileyonlinelibrary.com]

> their end of life wishes. And that really touched both of our hearts [...]' [Nurse 1]

Theme 2: Subjectivity and uncertainty leading to variations in practice and purpose

Participants appeared to report subjectivity in various aspects of ACV including: implementation, application, competencies, and effectiveness. Some participants seemed to state that their opinions of ACV were subjective and formed primarily from their experiences:

> 'Like, I can say I did this, and it was brilliant but [...] you know even the kind of saliva scales. [...] they're very subjective aren't they? You know what I think is a lot after 10 years would be different to what like a new band 5 thinks is a lot!' [physiotherapist (PT) 1]

> 'Does it work, or does it not work? Because of course I have patients where I use it, but I can't see changes from day to day. But it's difficult to set up a study because it's difficult to measure the sensitisation in the pharynx. Does it change when you give the ACV? Does it change for a short while or for longer terms?' [OT 1]

Similarly, participants described the application of ACV as subjective because of the variability in how patients respond to and cope with ACV, both within sessions and from day to day. One participant suggested that this subjectivity was more difficult for less experienced staff to manage, as it was impossible to follow a protocol. For this reason, many participants reported restricting the involvement in ACV to certain members of staff to maintain safety for patients and staff:

> 'And because it's quite subjective…you know you can't say oh she's going to be absolutely fine for those 10 minutes, 5 minutes, because you don't know how fatigued she was from the day before and stuff. So, it's not just as simple as…you can't follow a protocol as such and go oh we're going to do it for this. […] and that's where we felt that the staff with […] their registration, they've got that bit of extra knowledge. They'd be in a better position to make that call. Although, you know, just from a safety perspective, and just also then not to put too much of a burden on our support staff'. [PT 7]

Training of staff and the use of ACV competencies also appear to be largely informal and subjective. Many spoke of competencies using terms that could be considered to be subjective such as, 'feeling competent' and 'feeling comfortable':

> '…and then it'll be us handing over to nurses. And if a nurse has had that one-to-one demonstration and is feeling competent with how it works, then they can trial it'. [SLT 2]

Participants stated there is considerable uncertainty about various aspects of ACV such as application, risks and harms, effectiveness and impact on length of stay. Uncertainty around application included patient selection, timing of use, frequency of use and air flow rates. Subsequently, many participants reported that ACV becomes a learning process, a process of experimentation or 'trial and error'. This appeared to lead to a highly variable approach reliant on individual clinical judgement:

> '…they're saying you know we use like 10 or 15 litres and then there's loads of hands going up! And I was like "Oh no, no! I'm not sure. We don't do that though!" I think that might be a bit much, but I don't know again if there's any…strict guidance on that…' [PT 1]

There were varying opinions amongst participants about how ACV should be applied and what the primary purpose of ACV is. Many participants were very focused on communication and, therefore, used ACV with a limited cohort of patients at a later stage. However, some participants reported that as they experimented with ACV—and the evidence evolved—they changed their focus of purpose, usually towards swallowing.

Theme 3: Knowledge and experience leading to control and caution

All participants stated that the implementation and application of ACV needed some level of control and caution. Often negative experiences—including serious adverse events such as subcutaneous emphysema, burst tracheostomy cuffs and gastric distension—had a profound impact on staff and teams. Four participants described five serious adverse events. Adverse events not only instigated a need for caution to protect patients but also created a need to protect staff and hospitals from potential litigation. In some instances, these adverse events resulted in the prohibition of ACV:

> 'What happened to our last patient [subcutaneous emphysema] was very, very, very important for me. We are supposed to take care of our patients so…it was something that stuck with me. […] I'm trained to do my best, but you know enough is enough. And you have to know when to stop. So, yes, I think that it's dangerous. That somehow if you don't know how to use it, it's…just don't use it if you don't know how to use it'. [SLT 3]

> 'They put air into […] the pilot balloon instead of the suction port. And so, that burst, and it did not affect the patient but just that it was a near miss. Something bad could have happened. And they wanted us to explore it further and so right now we're still in that phase of trying to figure out if we should reinstate or not'. [Nurse 1]

Some participants described a general perception amongst HCPs that ACV is benign and harmless. Many participants reported instances of ACV misuse and potential patient harm. Some participants also expressed a lack of trust that interventions would be carried out appropriately, with one participant describing anxiety that other members of the multidisciplinary team (MDT) would 'go a little bit rogue' with ACV. Most participants felt that incidents were a result of a lack of understanding of the potential risks of ACV or how to use it safely:

> 'One of the […] physios came to see me […] and said "I walked in the room and the nurse was doing 10 litres! The cuff was down. She had no idea what she was doing!" […] But you do tend to find with nurses, it just gets passed on, word of mouth, rather than through the formal process of training or competency based…learning'. [PT 3]

> '…I think some of the crit care nurses have used it…shall we say, kind of…guided…medically, maybe just, you know "let us try this and see if they can speak to us kind of thing?" Not like…as controlled as maybe we would trial it'. [PT 1]

They highlighted that staff training, particularly of nursing staff, was problematic due to the large numbers of staff and the high staff turnover, combined with limited numbers of potential patients. Many participants wanted standardised processes, procedures and training to ensure patient and staff safety. For many participants, as their knowledge and experience of ACV developed, their opinions on the need for caution grew stronger:

> '…over the…gosh 11 years of using it, my approach has very much changed. […] And I think I probably was one of the "oh you just stick a bit of oxygen on don't you? There's no problems!" […] But we've had some patients that have been really variable, where sometimes they're brilliant and other times they're terrible'. [SLT 10]

Theme 4: Worth a try or a last resort

This was the central theme of the study, with all other themes linking into this theme. This theme reflected the spectrum of opinions about ACV and its usefulness. Opinions ranged from people who think it is life-saving for patients, to those who think it should only be used as a last resort when all else has failed. One participant who considered it life-saving described the marked impact of ACV on comfort for some patients:

> '…when […] they've got a lot of sputum and that the air flow pokes it to their mouth, which we know it's going to do that! Some will find that unpleasant. Some will find that life-saving cos it's just something that had sitting there, that they can't clear…' [SLT 6]

Centrally, and more commonly, on the spectrum of opinion, were those who thought that ACV is worth a try. The rationale for ACV being 'worth a try' was the limited number of intervention options available and the underlying burden of needing to fix patients. Participants described positive ACV experiences reinforcing this willingness to give it a go:

> "'And like I say, if I had tried it and it hadn't worked, I wouldn't be pushing, you know you wouldn't push it! But I think if you know it works…and there's a chance it could work for your patient, you know you're going to try!" [PT 7]

> 'I think when you've got the lower awareness patients or the patients that cognitively are not able to do a full swallow programme, it's a bit like, well what else are you going to do? […] So, I think the benefits of it almost always outweigh the risk. But it does come with a caveat of there's no point in blasting air into someone's larynx if it's not going to make any difference'. [SLT 10]

At the other end of the spectrum, many considered ACV a last resort when all else had failed:

> '…and it was just kind of a very useful way…to be honest, it was when all else had failed!' [SLT 10]

For most participants this was a result of their success with early cuff deflation meaning they had little need for ACV. For some individuals it was related to limited access because of equipment issues, such as difficulties accessing thumb ports. For others, they simply wanted to stick to what they know and are more comfortable with: cuff deflation:

> ‘…I guess that’s one reason why we don’t use ACV is because we usually go for cuff down and Passy Muir first. And I’d say on the whole … that goes well. So, we don’t feel like we need to use ACV’. [PT 5]

> ‘So, I think that because we had much more experience with the traditional way, we used it…and we use it now’. [SLT 3]

Within the ‘Worth a try or a last resort’ theme, three sub-themes were developed: ‘Part of the toolbox’, ‘Useful but limited tool’, and ‘Following the patient’s lead’. These were developed to capture some of the nuances of the varying opinions of ACV and how these opinions were formed.

Sub-theme A: Part of the toolbox

ACV was considered to be part of the toolbox by most participants. Some described the role of ACV in the toolbox to be a bridge towards cuff deflation:

> ‘Absolutely. As another tool in the toolbox. […] the more tools you have, the better you can individualise’. [PT 2]

> ‘…when we’re using it, although we’re using it to get advantage of voice, we’re using it very much as a tool to try and rehabilitate swallow and desensitise their airway really. As a step towards being able to cope with cuff down. So, in hospital, I very much see it as a way, a stepping-stone to start cuff down’. [PT 4]

Participants seemed excited to have another option in their toolbox, as most people felt that they had few options available. The rationale for adding ACV to their toolkit varied amongst participants, and included direct experiences, reports from other clinicians, benefits to staff and improved patient–staff relationships. One participant expressed the opinion that interventions are selected for their toolkit primarily based on their experiences:

> ‘But I mean to be honest that’s like a lot of physiotherapy really. It’s not…we talk about evidence-based practice [Laughs] and it’s like, you know, kind of what’s worked? Or worked for your patient? Did it do any harm? No. Okay. That’s another tool in the toolkit’. [PT 7]

Even those who use ACV rarely, continue to consider this intervention as having a place in their toolbox, even if it is right at the bottom. For these participants, there is usually a need to re-learn and re-orientate each time they use ACV:

> ‘…I’m very open-minded and very positive about it. I just haven’t…you know seen the same…patient candidacy and you know benefit in our group that has been reported elsewhere. So, a little bit curious about that. And yes, just interested to learn more and […] I continue to have it, as I say, in my toolbox’. [SLT 13]

> ‘…it’s always something that I need to re-orient every time I want to use it because we don’t use it very often’ [SLT 7]

Sub-theme B: Useful but limited tool

Most participants thought that ACV is not a magic fix-all for all patients: it is a useful but limited tool. Participants reported one limitation was the variability in its success and effectiveness:

> ‘And I think I always remind people it’s not always successful, so I don’t ever go in hoping that it’s just going to be this magic thing that works’. [SLT 8]

Various aspects of ACV led to participants judging ACV to have limited utility including variability limiting functionality, concerns regarding laryngeal drying limiting use, need for advanced skills for implementation, need for time and effort before positive outcomes achieved, subtle improvements and patients’ fatigue. Some participants expressed disappointment that ACV did not meet their expectations for communication and some described this in stark terms:

> ‘…well given that we don’t use it very often, that probably says enough! [Laughs] in that I just don’t think it’s that useful for our patients. I don’t think they get the communication success initially, or even with some training, for it to be warranted to embed into our approach with patients’. [SLT 11]

Several participants stated that ACV is also only suitable for a niche group of patients for a limited window of opportunity. Participants stated that identifying this niche group of patients can be problematic and developing skills using ACV is difficult due to the restricted use in select patients:

> 'It's not going to completely revolutionise care, but in its little role in a small select cohort of patients, and in a wider cohort of patients for a short amount of time, it's got a real role to impact and improve patient care'. [advanced critical care practitioner (ACCP) 1]

> 'I think it's a good thing for a very few people…but that's part of the problem. Like, no one will…a lot of people won't become really good at doing it because we have so few'. [PT 2]

Sub-theme C: Following the patient's lead

Part of the underlying reasons for participant's views and opinions of ACV appeared to be related to the patient experience of ACV and HCPs following the patient's lead when choosing and using interventions. Unfortunately, many participants reported that some patients tend to find ACV uncomfortable, dislike ACV or find it unacceptable:

> '…and then they're like: "I don't like it, take it away,' I'd rather have no voice than this feeling."' [SLT 7]

> 'When we have done ACV with the spinal population for communication […] they tend to be very…prescriptive in what they do want and what they don't want. And what they do find comfortable, and what they don't find comfortable. And ACV quite often is just "no, too uncomfortable. Not doing that!"' [SLT 10]

This dislike of ACV seemed more common when ACV was used for communication, which requires higher flows than are used for swallowing. Participants reported that certain patient groups seem to be more emphatic in what they are willing and unwilling to accept when it comes to interventions for communication. In particular, some participants stated that spinal patients found ACV unacceptable, though others reported that spinal patients received the most benefit from ACV of all patient groups. Where patients can be encouraged to persevere with ACV, some participants reported that patient comfort level can improve:

> 'It can be a bit dry and irritating for the patient, but that usually is I guess in the first couple of trials. And once, it's like anything, once the patient sort of gets the hang of it, they…you know it doesn't seem to be a problem after that'. [PT 8]

Participants described instances of ACV improving patient–staff and family–staff relationships because of the humanising effect, along with improvements to patient identity and autonomy:

> '…when they heard their sounds, even saying "aah" or "ee," when they heard their sound, you could see the smile on their face. They feel like a human being'. [Nurse 1]

Participants described the importance of choosing and tailoring interventions according to the individual and ensuring that goals and outcomes are meaningful to them. One participant felt that when it comes to methods to support communication, patient choice and comfort is key, whereas for swallowing rehabilitation patients are happier to accept uncomfortable interventions if ultimately it improves their swallowing:

> 'No, I think it's more because I guess for communication it's more about their quality of life and them, so they can sort of opt to say: "No, I don't really like it. I don't want to use it, I'd rather just mouth." […] whereas, when it comes to swallow, I'm directing it […] I feel like people are much more tolerant of things when they're therapeutic and a rehab goal […] whereas, when they're like: "I don't have to use this and it's not of any benefit therapeutically to me it's just more about my quality of life." Then they're like: "No, I don't like it."' [SLT 7]

DISCUSSION

Four connected key themes were developed using a reflexive thematic analysis of interviews with 24 HCPs. These themes included (1) moral distress amplifying the need to fix patients; (2) subjectivity and uncertainty leading to variations in practice and purpose; (3) knowledge and experience leading to control and caution; and (4) worth a try or a last resort. Theme four contained three sub-themes: (a) part of the toolbox; (b) useful but limited tool; and (c) following the patient's lead.

An underlying desire to make a difference for patients was expressed by several participants as a 'need to fix' patients. The underlying need to fix patients, which could be described as a moral sensitivity, can leave HCPs vulnerable to moral distress (Burston & Tuckett, 2013; Lützén et al., 2010). Moral distress has been described as 'knowing what is good for the patient but being unable to provide it because of constraints that are beyond our control' (Čartolovni et al., 2021). Moral distress can result in the development of harmful 'negative feeling states' including feelings of blame, guilt, anguish, powerlessness and betrayal of personally held values (Tigard, 2019; Čartolovni et al., 2021). Persistent experience of moral distress can ultimately lead to moral injury where burnout and compassion fatigue can develop (Čartolovni et al., 2021). However, positive aspects of moral distress have also been reported including revealing the depths of care that HCPs have for patients, improved self-understanding, improved skills in compassionate care and improved patient care (Corley, 2002; Henrich et al., 2017; Tigard, 2019). A potential extension of these positive aspects could be to reinforce a HCP's determination to make a difference for their patients, despite the constraints.

Moral distress has been shown to be common in HCPs working in ICU, with a significant association between moral distress and the female gender (Colville et al., 2019; Dodek et al., 2019; Fumis et al., 2017; Kok et al., 2021; Vincent et al., 2020). Furthermore, moral distress in ICU nurses has been shown to occur more intensely and more frequently than in non-ICU nurses, and adult ICU nurses had greater frequency and intensity of moral distress compared to paediatric and neonatal ICU nurses (Dyo et al., 2016). This study highlighted various examples of moral distress experienced by HCPs, particularly female participants, which led to feelings of guilt, powerlessness and frustration. However, for the most part, rather than leading to burnout and compassion fatigue, these experiences and feelings appear to have reinforced and amplified their 'need to fix' patients. Most participants were willing to try anything that might help their patients: doing anything was better than doing nothing. It is in this context that opinions about ACV are formed and implementation decisions are made. The moral distress of knowing that patients are extremely frustrated, combined with a strong underlying 'need to fix', may influence ACV uptake and application.

A systematic review of ACV highlighted the limited and low-level evidence available for ACV (Mills et al., 2022b). The impact of this is borne out in the responses of participants in this study, with most stating that there is substantial subjectivity and uncertainty surrounding ACV. This subjectivity and uncertainty appear to be a result of the limited evidence and guidance available, its variable interpretation and application and patient heterogeneity. Participants seemed to rely more heavily on their experience and 'expert opinion' when making decisions about practice, which is common when research evidence is limited (Pearson et al., 2005, 2007).

One element of subjectivity that appeared to be described by participants was related to ACV competencies. The Health and Safety Executive in the United Kingdom define competence as 'the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely' (Health & Safety Executive, 2022). Much of the healthcare literature related to competencies states that an assessment process is required to deem someone competent (Ääri et al., 2008; Epstein & Hundert, 2002; Epstein, 2007; Hanley & Higgins, 2005; Okuyama et al., 2011; Skills for Health, 2022). Competencies also need to be maintained, as the knowledge and skills related to a particular task are likely to change as the evidence grows (Epstein, 2007). However, most of the participants described ACV competencies—where they existed—in a subjective way. Although a person can feel confident or comfortable performing a particular task, and this may be a sign of experience and skill, they cannot feel competent. These subjective descriptions of competency do not align with the stated definition. There are no national or international competency frameworks for ACV, and less than 20% of survey participants reported using competencies for staff (Mills et al., 2022a). This is likely contributing to the varying approaches described, even within teams. However, developing objective competencies may be problematic given the uncertainties surrounding ACV, the absence of clear standards and expectations and the lack of agreement for optimal application (Epstein, 2007; Mills et al., 2022a).

The uncertainty and subjectivity seen in all aspects of ACV result in wide practice variation, for example, the high air flow rates reported by some participants. The process of ACV is described by many participants as one of experimentation and trial and error, which compounds this variation in practice, including the variation in purpose. Most participants seemed focused on communication and there appeared to be an assumption that it is the primary purpose and the most important benefit. This may be due to the nomenclature highlighting communication: 'above cuff *vocalisation*' and '*talking* tracheostomy'. This focus may have led to missed opportunities to realise the sensory and swallowing benefits and likely resulted in delayed use with fewer patients.

Participants reported that as well as increased knowledge and experience with ACV leading to a change in focus of purpose, it also increases the need for caution. The most striking examples of this were some of the adverse events experienced by participants, and the profound effect they had on them and their teams. For some, these experiences were upsetting—with evidence of moral distress and feelings of guilt and betrayal of their own values—but, all participants described concern and a desire to instigate processes to protect patients, staff, and their organisation. Despite the prohibition of ACV in two settings following adverse events, the participants wanted ACV reinstated, still believing in the potential value of ACV.

Many participants felt that lack of knowledge and over-enthusiasm in the MDT were key factors contributing to unsafe use of ACV. There was a lack of 'competence trust', with some participants not trusting in other staff competence to use ACV appropriately, and anxieties about potential risks to patients (Newell & Swan, 2000). However, there was also self-doubt, with some participants feeling that they did not have adequate knowledge or skills to provide ACV optimally or safely. This lack of trust in self and others is likely a consequence of the limited evidence and the uncertainties and subjectivities surrounding ACV. Lack of trust, both intra- and inter-professionally, has been highlighted by other researchers as a contributing factor to compromised patient care and decision-making (Jones & Jones, 2011; Vivian et al., 2009). The lack of competence trust evident in this study may be partly due to the fact that many services are not using competencies or are using subjective competencies. Most participants advocated for: staff training, safety processes, standardisation, governance structures, clear responsibilities, good communication with the MDT and careful patient selection.

The spectrum of opinion on ACV ranged from believing ACV was 'life-saving' for some patients, to thinking it was 'worth a try', and at the other end thinking ACV was a last resort. Participants views varied widely, even when ACV was used with the same patient group and regardless of level of experience with ACV, the professional group or geographic location of the participant. Potential contributing factors to these differences in opinion include research experience, patient group, staffing levels, clinical experience with ACV, the primary purpose and/or the application approach (e.g., continuous flow vs. intermittent flow, non-humidified oxygen vs. humidified medical air, flow rates and different brands of tracheostomy tubes). No participants described observing a difference in effectiveness of ACV with different brands of tracheostomy. However, the varying designs of tracheostomy tubes with different subglottic port diameters and exits will likely lead to different air flow velocities and pressures applied to the laryngo-tracheal mucosa which may lead to varying outcomes and comfort levels for patients. Evaluating the mechanics of ACV with different brands of tracheostomy tubes is an important area for future research. Despite the uncertainties about effects and risks—and in the face of the profound impact of negative experiences—ACV seems to be considered worth trying by many. The lack of viable alternative treatment options seems to outweigh concerns over efficacy and safety, and there is a willingness to try anything that might improve outcomes. Pearson et al. report that it is common for clinicians to adopt interventions despite limited research available, due to having to respond to patient need pragmatically (Pearson et al., 2005).

Reflexivity

The first author is a Clinical Specialist Speech and Language Therapist with 15 years clinical experience, 12 of which have included working with patients with tracheostomies. They first used ACV in 2012 in an acute ward setting and more regularly since 2016 in critical care. They professionally knew some of the participants (four SLTs and two PTs), which could have influenced interview conduct and may have led to more relaxed responses. The first author was both an insider, being an HCP who uses ACV and an outsider when speaking to non-SLTs. This may have influenced the openness of participants.

Many of the participants' opinions mirrored those of the first author, particularly with respect to adverse events and the increased need for control and caution with ACV use. They were surprised by some of the negative perceptions expressed and to ensure a balanced analysis, each transcript was actively searched for positive comments about ACV.

Study strengths and limitations

The sample size of 24 participants is slightly larger than average for ICU-speciality qualitative interviews, with one systematic review reporting a median of 19 HCPs (Anderson et al., 2019). The use of semi-structured interviews allowed the adaptation of questions and flexibility to respond to the direction of the participant. Purposeful sampling allowed us to improve the spread of respondents across professional groups, countries, and level of experience. However, no doctors and only one ACCP (nursing background) and one nurse were recruited. We were also unable to recruit any respiratory therapists. From discussions with North American clinicians, it is apparent that ACV is not widely used. In the United States, this is in part due to a lack of Food and Drug Administration approval to use subglottic tracheostomy tubes in this manner. Furthermore, those clinicians in the United States who had previously been using it reported a lack of respiratory therapist involvement. A predominance of SLTs were recruited, and this is likely partly due to the fact that the first author is an SLT and partly a result of SLTs being generally more involved in ACV. There was a higher proportion of staff from the United Kingdom, and secondarily, from Australia, likely due to a disproportionate use of ACV in these countries. Although there is limited diversity in the participants recruited, this is reflective of current ACV clinical practice (Mills et al., 2022a). This study highlighted that SLTs and physiotherapists were most likely to be leading ACV implementation and application, however, most participants described there was a multidisciplinary approach to decision-making regarding ACV use. Recruitment was problematic due to pressures of the pandemic and due to an unforeseen interruption to the study, interviews were conducted over the course of 13 months, with a pause of 7 months. This may have affected the responses obtained but provided a wider spectrum of responses from different stages of the pandemic.

Clinical implications

This study has highlighted the variability of implementation and uptake of ACV. Some of this could be part of the phenomenon where there is rapid adoption of interventions, despite limited evidence, because there is an excitement about a new intervention combined with 'magical thinking, where doing something is seen as better than doing nothing' (Dixon-Woods et al., 2011). These ideas of newness and 'doing something' were frequently discussed by study participants. It is essential to apply a formal approach to the adoption of new interventions or innovations to improve the implementation process (Dixon-Woods et al., 2011).

Some of the subjectivity and uncertainty surrounding ACV might be improved with robust, standardised protocols, guidance and competencies. A wider focus of purpose for ACV, to include swallowing as well as communication, might maximise the potential benefits for ACV by supporting earlier use with a greater number of potential candidates. Ensuring regular use would also help to support competency maintenance and avoid the need for re-orientation each time ACV is used. Adopting an MDT simulation approach for ACV training might help to improve MDT working and ACV implementation (Weller et al., 2012).

Serious adverse events do occur and can lead to prohibition of ACV. Implementing standardised procedures, safety processes and competencies—alongside thorough staff training—might help to reduce incident frequency, thereby protecting patients, staff and hospitals. Many respondents provided examples of approaches they recommended to maximise safety and effectiveness (Supporting Information File 3).

CONCLUSION

This study explored the experiences and opinions of HCPs of ACV. Underlying HCPs' motivations and opinions about ACV seems to be the moral distress they experience which amplifies their essential 'need to fix' patients and may influence their opinions and decisions regarding ACV. Furthermore, the underlying subjectivities and uncertainties surrounding ACV mean opinions appear to be formed primarily on the basis of experience. These experiences are likely to be impacted by the purpose for which they use ACV and their application approach, and likely explains the variety of opinions observed with many considering ACV to be worth a try or a last resort. As knowledge and experience of ACV increase, the belief that there is a need for caution to protect patients and staff increases also. More research is needed to reduce the subjectivities and uncertainties surrounding ACV, provide more guidance for application and support the development of objective competencies.

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CONFLICT OF INTERESTS STATEMENT

All authors declare no conflict of interest or competing interests in relation to this publication.

DATA AVAILABILITY STATEMENT

Supporting information is provided in the supplementary files. Additional data supporting this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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