ORIGINAL ARTICLE

A national survey on percutaneous tracheostomy practice in Malaysian adult general intensive care units

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ABSTRACT

Introduction: Percutaneous tracheostomy (PT) has gained increasing acceptance over surgical tracheostomy (ST) in the last few decades due to lower rates of postoperative infections, less bleeding, and cost-effectiveness. However, there has been little information regarding the PT practice in Malaysian adult general intensive care units (ICU). The objective of the study was to assess the current practice of PT in Malaysia.

Materials and Methods: This observational cross-sectional study used a validated questionnaire with 15 items. A total of 61 ICUs consisting of adult general ICUs under Ministry of Health (MOH) hospitals and adult general ICUs in university teaching hospitals were recruited into the study whereas ICUs in private hospitals and specialist ICUs were excluded from this study. The questionnaire was subsequently distributed to the heads of those 61 ICUs through existing WhatsApp or Telegram groups and the data collection period lasted four months.

Results: Fifty-three out of 61 ICUs participated. Ninety point six percent of the responses came from MOH hospitals, whereas 9.4% came from university hospitals. The heads in participating ICUs comprised 35.8% intensivists and 64.2% anaesthetists. At the time of the survey, 45.3% of ICUs were still practicing PT, 13.2% had performed PTs in the past but stopped whereas 41.5% were not. The rate of PT (both actively practising and formerly practised combined) in intensivist-led ICUs was 94.7% compared to 38.2% in anaesthetist-led ICUs. Intensivists performed PTs in almost two-thirds of ICUs, while anaesthetists did so in another two-thirds. The vast majority of assistants were medical officers at 96.8%. The Ciaglia Blue Rhino technique was the predominant technique (71.0%) while airway management during the technique was solely via endotracheal tube. Ninety-six point eight percent of the ICUs employed routine infiltration of local anaesthetics prior to PT. Thirty-eight point seven percent of performers of PT routinely used fibreoptic bronchoscopy but only 6.4% used ultrasonography. Seventy-four point two percent used tracheostomy tubes with inner cannulae and 83.9% routinely followed up with patients post-discharge from the ICU. Seventy-nine point two percent of respondents believed PT was the method of choice for elective tracheostomy in the ICU but only 49.1% perceived PT to be safer compared to ST.

Conclusion: PT is commonly practised in intensivist-led ICUs. PT is generally preferred for elective tracheostomy but there is a variability in perceptions regarding its safety compared to ST.

KEYWORDS:
Tracheostomy, surveys and questionnaires, Malaysia, intensive care units, attitude

INTRODUCTION

Tracheostomy is reported in the medical literature as one of the oldest surgical operations and was almost exclusively performed in emergency settings until half a century ago.[1] It is used to protect airways, facilitate long-term mechanical ventilation, including weaning, relieve upper airway obstruction, and provide frequent bronchial toileting.[2] Many studies have found tracheostomy to be superior to long-term endotracheal intubation in terms of intensive care units (ICU) stay duration, infection rates, sedation requirements, patient comfort, laryngeal trauma, nursing care, early oral feeding, and resource utilisation in the ICU.[2-5]

First described in 1955, percutaneous tracheostomy (PT) did not gain traction in medical practice until 1985, when Ciaglia et al. introduced the Percutaneous Dilatational Tracheostomy technique, and since then, other variations have been introduced.[6-7] Many studies recommended PT due to the fact that it can be performed quickly at the bedside without the need for potentially hazardous patient transfers.[6] Moreover, PT was associated with lower rates of postoperative infections and bleeding and also cost-effective.[8]

National surveys conducted in multiple geographically close European countries showed that the use of PT in clinical practice varied but shared common methodologies.[9-19] Outside of Europe, its practice was heterogeneous and country-specific.[20] Guidelines for PT at the international and national levels are rare, and in the absence of a set of recommendations, clinical practice is often guided by rules of thumb, expert opinions, and case reports.[21]

The latest clinical audit by the Malaysian Registry of Intensive Care (MRIC) showed that in 2020, 4.7% of 21,071 patients receiving MV in 57 ICUs had undergone tracheostomy, with 76.1% of them performed surgically rather than percutaneously.[22] Likewise, in 2021, 1.8% of

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25,807 mechanically ventilated patients required tracheostomies, with 82.7% of them being surgical tracheostomy (ST). Apart from that, there has been little information regarding practice variation of PT in Malaysian ICUs. A search for "Percutaneous Tracheostomy in Malaysia" on PubMed yielded limited results, despite widely published recommendations supporting its use. An audit by Rao et al. in 2003 reported that PT was the technique of choice for tracheostomy in the ICU of Hospital Kuala Lumpur, whereas in 2004, Tan et al. concluded in a prospective study at Hospital Sultanah Aminah, Johor Bahru, that PT was a safe alternative to ST.[23,24] Neither of those studies evaluated the daily practice of PT in accordance with operators, assistants, techniques, adjuncts, and follow-ups.

Based on past surveys evaluating ICU tracheostomy practices, we suspected that its practice in Malaysian adult general ICUs varies considerably. The purpose of this national survey was to ascertain the current practice of PT in Malaysian adult general ICUs. Specifically, the study aimed to determine the operators of PT, the frequency of different techniques of PT, the procedural adjuncts used during PT, the practice of post-PT follow-up care, and the current opinion on the technique of PT.

MATERIALS AND METHODS

Study Design and Protocol

This was an observational cross-sectional study based on a national survey of PT practice in Malaysian ICUs conducted from 01/10/2023 till 31/01/2024. This study employed total population sampling, which is a type of purposive sampling. The inclusion criteria were the adult general ICUs under Ministry of Health (MOH) hospitals that participated in the MRIC Annual Report 2020-2021 and the adult general ICUs in university teaching hospitals. Specialist ICUs (such as paediatric, cardiothoracic or neurosurgical ICUs), ICUs in private hospitals, and ICUs not listed in the MRIC Annual Report were excluded from the study.

Study Instruments

A questionnaire consisting of 15 items with various question formats (i.e., single-answer questions, multiple-answer questions, yes/no/sometimes, open-ended questions) was developed for this study. The following items were recorded: hospital category; ICU category; PT use in clinical practice; the operator; the assistants; preferred PT technique; method of airway management; use of local adjuncts; use of endoscopic guidance; use of neck ultrasound; use of tracheostomy tubes with inner cannulae; follow-up care for patients; and opinions on safety and attitudes towards PT. To ensure validity of the survey instrument, the questionnaire was reviewed by a panel consisting of five consultant intensivists registered with the National Specialist Registry of Malaysia. The questionnaire was also piloted in five ICUs to assess clarity and ease of use before it was distributed and directed to the heads of the ICUs.

Study Administration

A total of 61 ICUs were identified, which included 55 ICUs in MOH hospitals that participated in the MRIC Annual Report 2020-2021, as well as six ICUs in university teaching hospitals. A QR code linked to a Google Form based on the questionnaire was distributed to the heads of the ICUs through existing WhatsApp or Telegram groups. A participant information sheet and informed consent were included on the first page of the questionnaire, and all participants were assured of confidentiality and anonymity. Participants were given a duration of four months (01/10/2023 till 31/01/2024) to answer the questionnaire. The QR code was distributed again at a monthly interval during the period of data collection to act as a reminder to the participants who had not answered the survey.

Statistical Analysis

The data were exported from Google Forms into Microsoft Excel for cleaning before analysis. A descriptive analysis was performed on the data using the Statistical Package for the Social Sciences (SPSS) version 28.0 for Windows. Categorical variables were expressed as frequency and percentage and were also analysed using the crosstabs subroutine with the chi-squared (χ^2) test or Fisher's exact test, where appropriate, for statistical comparison between the groups. Statistical significance was set at a p value of less than 0.05.

Ethical approval

Each participant provided informed consent before completing the survey. The study was registered in the National Medical Research Register (NMRR ID-23-01950-ALC) and approved by the Medical Research Ethics Committee prior to the commencement.

RESULTS

Out of the 61 ICUs that were identified and included in this study, 53 responded to our questionnaire, resulting in a response rate of 86.9%, while the remaining eight ICUs, which did not respond, accounted for 13.1%. Table I shows the distribution of PT practice status among the 53 ICUs that responded to our survey according to hospital type and ICU type as well as their association. Of the 53 responding ICUs, 48 (90.6%) were from MOH hospitals, while five (9.4%) were from university hospitals. As illustrated by the table, there were equal numbers of ICUs in MOH hospitals that were actively practising and that had never practised PT, each accounting for 21 hospitals or 43.8%, whereas another six, or 12.4%, of MOH hospitals had practised PT in the past but had stopped. As for university hospitals, three (60.0%) ICUs were still actively performing PT, one (20.0%) had stopped practising PT, whereas another one (20.0%) had never practised it. There was no statistically significant association between hospital type and PT practice status, as the Fisher's exact test yielded $p \approx 0.2956$ ($p > 0.05$). Based on the same responses obtained from the 53 ICUs, the PT practice status was also categorised according to the specialty/background of the head of each ICU: 19 (35.8%) intensivist-led ICUs and 34 (64.2%) anaesthetist-led ICUs. In the former group, 16 (84.2%) intensivists were still performing PT, and two (10.5%) had done it in the past, but one (5.3%) had never practised it. In contrast, among the 34 ICUs led by anaesthetists, only eight (23.5%) were actively involved in PT. Five (14.7%) ICUs had stopped carrying out PT by the time of the study, but the majority (21) had never attempted PT, accounting for 61.8% of the anaesthetist-led units. In contrast, there was a

statistically significant association between ICU type and PT practice status (χ^2=19.5000, p<0.0001), indicating that intensivist-led and anaesthetist-led ICUs differed in their PT practice patterns.

Factors Behind Non-Practice of PT in ICUs
Of the 53 respondents, ICUs that formerly practised and had stopped practising provided various reasons for not practising PT at the time of the study: Eight ICUs mentioned budget/equipment constraints, while another eight noted that the main issue was a limitation/lack of expertise. Two ICUs stated that all tracheostomies in their units were managed by ENT specialists, with only the surgical method being employed by that team. One ICU reported that time constraints, due to both clinical and academic responsibilities, complicated efforts for PT.

Personnel, Clinical Practices, and Procedural Aspects of PT in ICUs
Tables II and III summarise the additional responses from the 31 ICUs that had experience with PT, comprising 24 ICUs actively practising PT and seven ICUs that formerly practised it.

Respondents were allowed to report more than one main operator and/or more than one assistant. For the main operators of PT, intensivists performed PT in nearly two-thirds of the ICUs (20 or 64.5%), with anaesthetists also performing PT in the same proportion (20 or 64.5%). Additionally, one (3.2%) ICU reported that general surgeons were involved, while another (3.2%) employed an ENT surgeon. Two (6.4%) ICUs allowed medical officers to serve as the main operator. In contrast, regarding assistants for PT, the majority of the 31 ICUs involved medical officers (30 or 96.8%), followed by anaesthetists assisting in 20 or 64.5% ICUs. Intensivists assisted in six (19.4%) ICUs, while nurses also served as assistants in the same number of ICUs (six or 19.4%). Lastly, only two (6.5%) ICUs employed medical assistants to assist with PT.

PT Technique
The most commonly used technique for PT was Ciaglia Blue Rhino, accounting for 22 or 71.0% of the ICUs. This was followed by the Basic Ciaglia technique, employed in five (16.0%) ICUs, while the remaining 4 (13.0%) ICUs used Griggs technique for the procedure.

Airway Management
Regarding the routine airway maintenance method during PT, the sole technique used in all 31 (100%) ICUs was the endotracheal tube. None of the respondents reported the use of a laryngeal mask airway as a method of airway maintenance during PT.

Use of Local Medications
For medications routinely administered prior to PT, 23 or 74.2% of respondents used a combination of local anesthetics and vasoconstrictors, while seven (22.6%) applied only local anesthetics. Only one ICU (3.2%) reported not using any medications.

Use of Fibreoptic Bronchoscopy
When it came to the use of fibreoptic bronchoscopy during PT, 12 out of 31 respondents routinely implemented it, representing 38.7% of the ICUs. However, 14 or 45.2% did not incorporate fibreoptic bronchoscopy in their PT practice. Meanwhile, five (16.1%) ICUs only sometimes used it, specifically to manage potentially difficult airways.

Use of Ultrasonography
Similarly, the majority of ICUs, comprising 22 or 71.0%, did not routinely use ultrasonography during PT, while only two (6.4%) ICUs consistently used it. Nonetheless, seven (22.6%) ICUs indicated that ultrasonography was sometimes employed due to difficult surface landmarks and possible aberrant vasculatures or goitre.

Use of Tracheostomy Tubes with Inner Cannulae
Regarding the implementation of tracheostomy tubes with inner cannulae, over half of the ICUs (23 or 74.2%) incorporated them as part of their routine practice, seven (22.6%) ICUs did not use them, and only one ICU (3.2%) reported using them occasionally, depending on the availability provided by the PT kit.

Post-Procedure Care
Similarly, a significant majority of ICUs (26 or 83.9%) routinely arranged follow-ups for their post-PT patients after discharge from the ICU, whereas post-discharge visits were not part of PT practice in five (16.1%) ICUs.

Opinions on PT as the Method of Choice and its Safety
All respondents were asked about their opinions on PT as the method of choice for elective tracheostomy in ICUs and its safety profile compared to ST, regardless of the status of PT practice in their ICUs. Tables 4 and 5 summarise these findings and their association with ICU type. As shown in Table IV, 42 out of 53 respondents (79.2%) indicated that PT was their preferred method for elective tracheostomy in ICUs, while 11 (20.8%) did not agree that PT was the better option in this context. There was a statistically significant association between ICU type and PT being the preferred method of choice for elective tracheostomy (Fisher's exact test, $p \approx 0.0045$), with intensivist-led ICUs more frequently reporting PT as the preferred method. Despite the majority favouring PT for elective cases, Table V shows that less than half (26 out of 53 ICUs, or 49.1%) believed that PT was safer than ST. Interestingly, 27 ICUs (50.9%) disagreed with this view. There was no statistically significant association between ICU type and the perception of PT being safer than ST ($\chi^2 = 3.3180$, $p = 0.0685$).

Some respondents provided additional comments. Thirteen emphasised the importance of patient selection and safety to avoid complications associated with percutaneous tracheostomy (PT). They generally preferred PT for straightforward cases without difficult airways, while surgical tracheostomy was considered a better option for patients with potentially challenging airways. Eleven responses highlighted that PT was valuable in saving operating theatre time and assisting ICU bed turnover, as it could be quickly performed in the ICU without needing to book OT slots. However, seven respondents noted that PT required

Table I: Respondent Profile - Association of Hospital Type and ICU Type with PT Practice (N=53)

	Total	PT practice status			Chi-squared (χ^2) test / Fisher's exact tes
		Still practising	Formerly practised	Never practised	
Valid respondents	53/53 (100%)	24/53 (45.3%)	7/53 (13.2%)	22/53 (41.5%)	
Type of hospital					$p \approx 0.2956$
MOH hospital	48/53 (90.6%)	21/48 (43.8%)	6/48 (12.4%)	21/48 (43.8%)	
University hospital	5/53 (9.4%)	3/5 (60.0%)	1/5 (20.0%)	1/5 (20.0%)	
Type of ICU					
Intensivist-led	19/53 (35.8%)	16/19 (84.2%)	2/19 (10.5%)	1/19 (5.3%)	$\chi^2 = 19.5000$
Anaesthetist-led	34/53 (64.2%)	8/34 (23.5%)	5/34 (14.7%)	21/34 (61.8%)	$p < 0.0001$

Table II: Profile of Routine Personnel Involved in PT - Performers and Assistants (N=31)

	Total
Valid respondents	31 (100%)
Personnel routinely performing PT (multiple answers)	
Intensivist	20/31 (64.5%)
Anaesthetist	20/31 (64.5%)
General surgeon	1/31 (3.2%)
Ear, nose & throat surgeon	1/31 (3.2%)
Medical officer	2/31 (6.4%)
Personnel routinely assisting PT (multiple answers)	
Intensivist	6/31 (19.4%)
Anaesthetist	20/31 (64.5%)
Medical officer	30/31 (96.8%)
Medical assistant	6/31 (19.4%)
Nurse	2/31 (6.5%)

Table III: Practices and Techniques Used for PT Among Respondents (N=31)

	Total
Valid respondents	31 (100%)
Main technique of PT used	
Ciaglia Blue Rhino	22/31 (71.0%)
Basic Ciaglia	5/31 (16.0%)
Griggs	4 /31 (13.0%)
Method of airway management routinely used during PT	
Endotracheal tube	31/31 (100%)
Laryngeal mask airway	0/31 (0%)
Medication(s) routinely administered for PT	
Local anaesthetics	7/31 (22.6%)
Vasoconstrictors	0/31 (0%)
Local anaesthetics and vasoconstrictors	23/31 (74.2%)
None	1/31 (3.2%)
Fibreoptic bronchoscopy routinely used during PT	
Yes	12/31 (38.7%)
No	14/31 (45.2%)
Sometimes	5/31 (16.1%)
Ultrasonography routinely used during PT	
Yes	2/31 (6.4%)
No	22/31 (71.0%)
Sometimes	7/31 (22.6%)
Tracheostomy tubes with inner cannulae routinely used for PT	
Yes	23/31 (74.2%)
No	7/31 (22.6%)
Sometimes	1/31 (3.2%)
Post-discharge follow-ups routinely arranged for PT	
Yes	26/31 (83.9%)
No	5/31 (16.1%)

Table IV: Association Between ICU Type and PT as the Method of Choice for Elective Tracheostomy (N=53)

	Total	PT as the method of choice for elective tracheostomy in ICU		Fisher's exact test
		Yes	No	
Valid respondents	53 (100%)	42/53 (79.2%)	11/53 (20.8%)	p=0.0045
Intensivist-led ICU	19/53 (35.8%)	19/19 (100%)	0/19 (0%)	
Anaesthetist-led ICU	34/53 (64.2%)	23/34 (67.6%)	11/34 (32.4%)	

Table V: Association Between ICU Type and Perception of PT Safety Compared to ST (N=53)

	Total	PT perceived to be safer compared to ST		Chi-squared (χ2) test
		Yes	No	
Valid respondents	53 (100%)	26/53 (49.1%)	27/53 (50.9%)	χ^2=3.3180
Intensivist-led ICU	19/53 (35.8%)	13/19 (68.4%)	6/19 (31.6%)	p=0.0685
Anaesthetist-led ICU	34/53 (64.2%)	13/34 (38.2%)	21/34 (61.8%)	

experienced staff, costly equipment, and questioned its viability in certain settings where responsibility for follow-up care could be a limiting factor. On a similar note, one respondent stated that PT may only suit hospitals with high OT workloads and high ICU bed occupancy rates, while another suggested the need for ENT follow-up on PT patients. Four respondents reiterated that PT and surgical tracheostomy were similar in terms of safety and efficacy.

DISCUSSION

Our study achieved a high response rate of 86.9% among the target ICUs in both MOH and university hospitals, indicating that the results accurately and reliably reflect PT clinical practice in Malaysia. Nevertheless, the fact that 13.1% of respondents did not reply to our inquiry could introduce some bias to our findings. However, this limitation may potentially be mitigated by the standardised training pathways for ICU heads in Malaysia, whether for intensivist or anaesthetist, which follow common syllabi overseen by national conjoint boards, which likely minimise variations in clinical practice. Therefore, we believe that we have successfully sampled a wide cross-section of ICUs, further validating our results.

Of our respondents, 58.5% had experience performing PT, while 41.5% had never practised it. This indicates a low PT rate in Malaysia, despite its widespread acceptance since introduction, as shown by many past studies in Europe; the Netherlands (61.8%), Germany (86%), Spain (82%), Italy (89%), and the UK (75%-100%).[8,11,13-18] Respondents reported that a lack of training among staff and limited resources in their settings were the major obstacles for PT. To address this, both implementing training programs and adequately allocating resources specific to PT in all ICUs must be considered to increase the PT rate.

The absence of a statistically significant association between hospital type and PT practice status may reflect shared constraints across both MOH and university hospitals. Both types of institutions may face similar issues, such as budget limitations, lack of equipment, or shortage of expertise, making the type of hospital less decisive. Furthermore, there might be variation within each hospital type. For example, some MOH hospitals may be better resourced than others, while some university hospitals face similar limitations, thus making broad categorisation less predictive. In fact, as reported by the respondents, some ICUs depended on ENT specialists who only perform surgical tracheostomies, while others were affected by time constraints due to both clinical and academic demands. These findings suggest that PT practice patterns are determined more by local factors and available resources rather than by hospital type alone.

However, our study found that intensivist-led ICUs (94.7%) had more experience performing PT compared to anaesthetist-led ICUs (38.2%), a trend similarly reported in national surveys conducted in Europe.[13,14,17] The difference was statistically significant ($p<0.05$), indicating a strong association between the specialty of the ICU head and the likelihood of performing PT. This may likely be because PT is a procedural skill intensivists are expected to attain during their training, whereas it is not part of the core procedures among Malaysian-trained anaesthetists. While training more intensivists can lead to more PT being performed, implementing PT training or credentialing programs in anaesthetist-led units can also increase its adoption rate in ICUs overall. However, it is noteworthy that some intensivist-led ICUs that formerly practised PT had since stopped. While the presence of trained intensivists increases the likelihood of adopting PT, maintaining its practice depends on factors like resource availability, local priorities, and departmental decisions, as highlighted in the previous paragraph.

In relation to that, despite the lower PT rate in ICUs led by anaesthetists, an equal proportion of intensivists and anaesthetists served as primary PT operators. This suggests that anaesthetists demonstrate general competence in performing PT, further reinforcing the need for specific PT training programs to support broader adoption in anaesthetist-led ICUs.

Regarding PT assistants, an overwhelming majority were medical officers working in ICUs, likely reflecting the generally low numbers of specialised doctors in Malaysian ICUs, whether intensivists or anaesthetists. This basically highlights the need for non-specialists to act as assistants. Therefore, it is important to extend PT training to medical officers to improve outcomes and reduce associated risks and complications.

In terms of technique preferences, most ICUs favoured the Ciaglia Blue Rhino technique over others, such as the Basic Ciaglia and Portex Griggs. This aligns with practices seen in Germany (69.4%) and the UK (55%-64%), where Ciaglia Blue Rhino had become the most popular PT technique as it was technically simpler, user-friendly, less time-consuming, and less traumatic.[13,17,18,25]

For airway maintenance, 100% of the ICUs with PT experience relied solely on endotracheal tube as the primary method, a higher rate than that reported in the UK (92%-95%) and Italy (83%).[14,17,18] Although we did not inquire about the reasons for such a homogenous practice, we infer that endotracheal tube was preferred due to its secure airway properties, particularly in potentially difficult airways. In the UK, laryngeal mask airways and microlaryngeal masks had been used in small numbers of cases (2%-5%) as described by Krishnan et al.[17] However, reasons for such practice were not inquired by the authors.

Regarding adjuncts routinely used in PT practice, nearly three-quarters of respondents reported using a combination of local anaesthetics and vasoconstrictors in their ICUs, while the remainder preferred only local anaesthetics. This ratio (combination 95% vs. local anaesthetics only 5%) is similar to figures reported by Veenith et al in a British study.[18] Nevertheless, no other studies surveyed this aspect of PT probably because the choice is unlikely to significantly affect aspect of PT practice as intravenous agents are commonly used to control pain in ICU patients.

For the use of fibreoptic bronchoscopy during PT, only 38.7% of ICUs practised it routinely, comparable to rates from surveys in the Netherlands (36%) and Spain (16%).[8,11] This contrasts with trends in other major European countries, particularly the UK, where successive national PT practice studies have shown a progressive adoption of fibreoptic bronchoscopy.[13-18] Fibreoptic bronchoscopy has been shown to decrease the risk of iatrogenic damage and misplacement of the PT tube, but in less experienced hands, it can compromise ventilation and increase costs.[8,16,26-28] The low fibreoptic bronchoscopy usage rate in Malaysian ICUs may be due to resource limitations, underscoring the importance of appropriate support in these settings.

Seventy-one percent of units did not favour the use of ultrasonography in routine PT practice, unlike findings reported by Vargas et al. in Italy (10.7%).[14] Although the midline of the neck is assumed to be avascular, this is not always the case, and ultrasonography is essential to identify aberrant vessels.[16,29] In cases involving obese patients, ultrasonography had proven useful; one author successfully performed PT on a patient weighing over 200 kg with the aid of ultrasonography.[16]

The incorporation of tracheostomy tubes with inner cannulae and post-ICU discharge follow-ups into PT practice was high, at 74.3% and 83.9%, respectively. Tracheostomy tubes with inner cannulae are important as they have been shown to reduce infection and blockage rates.[17,30] Follow-ups help to minimise peri- and post-surgical complications and identify technique-associated sequelae, which can then be corrected and improved.[8] Surveys from Europe have reported lower follow-up rates, ranging from 7% in the Netherlands to 52% in the UK.[8,11,13,15-18] Some Malaysian ICUs do not conduct follow-ups, which may indicate staffing limitations. Indeed, some ICUs that had stopped carrying out PT reportedly did so due to a lack of coordination with ENT on follow-up protocols. This highlights the need for strengthened intra- and inter-department efforts, e.g. a tracheostomy team, to sustain PT practices and follow-up care.

A majority (79.2%) of units preferred PT for elective tracheostomy, given the many advantages of PT. With a statistically significant association found between ICU type and PT preference ($p<0.05$); intensivist-led ICUs were more likely to favour PT. This likely reflects the stronger procedural training in PT among intensivists compared to anaesthetists. Despite this, only about half of them thought it was safer than ST and no statistically significant association was observed between ICU type and the perception of PT being safer. This lack of association may be due to shared concerns across ICUs, such as the importance of patient selection, the need for experienced staff, and the risks in complex cases like difficult airways, as highlighted by respondents in their survey comments. A similar discrepancy was observed in the Netherlands, Spain, and Germany, where large majorities of ICUs preferred PT for elective tracheostomy but did not agree it was safer than ST.[8,11,13] Krishnan et al. found that 66.6% of the clinicians still favoured ST for morbidly obese patients while 50% of them used it in difficult airway cases.[17]

CONCLUSION

Our study provides an overview of PT practices in Malaysian ICUs. With a high response rate of 86.9%, we found that PT implementation in intensivist-led units was significantly greater than that of anaesthetist-led units, despite both groups being equally involved as operators in PT. Notable trends included the reliance on medical officers as assistants and limited use of FOB and USG during PT, underscoring the impact of staffing and resource limitations. Practices such as the preference for the CBR technique, use of ETT for airway maintenance, and the combination of local anesthetics with vasoconstrictors align closely with findings from previous studies. Additionally, Malaysian ICUs were found to be more regular in follow-up care compared to their European counterparts. Nevertheless, while PT was the preferred method for elective tracheostomy in critically ill patients, only half of the ICUs considered it safer than surgical tracheostomy.

CONFLICT OF INTEREST

The authors have no conflicts of interest.

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