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THE SYSTEMATIC REVIEW OF ADULTS AIRWAY DEVICES IN AWAKE TRACHEAL INTUBATION

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ABSTRACT

Background: *Although flexible bronchoscopes are often used for awake tracheal intubation, other airway instruments including videolaryngoscopes, direct laryngoscopes, and optical stylets are becoming more and more useful.*

Aims : *This systematic review is to review the the effects for airway devices on patients with awake tracheal intubation.*

Methods: *By comparing itself to the standards set by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. So, the experts were able to make sure that the study was as up-to-date as it was possible to be. For this search approach, publications that came out between 2014 and 2024 were taken into account. Several different online reference sources, like Pubmed and SCIENCE DIRECT, were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.*

Result: *In the PubMed database, the results of our search brought up 431 articles, whereas the results of our search on SCIENCE DIRECT brought up 289 articles. The results of the search conducted for the last year of 2014 yielded a total 23 articles for PubMed and 115 articles for SCIENCE DIRECT. In the end, we compiled a total of 6 papers, 5 of which came from PubMed and 1 of which came from SCIENCE DIRECT. We included six research that met the criteria.*

Conclusion: *In summary, in the context of awake tracheal intubation, flexible bronchoscopes, optical stylets, and channelled and unchannelled videolaryngoscopes were clinically equivalent airway devices. The time to tracheal intubation was longest with flexible bronchoscopes and shortest with optical stylets.*

Keyword: *Airway devices, awake tracheal intubation*

INTRODUCTION

The successful insertion of a tracheal tube into a patient who is conscious and breathing on their own is known as "awake tracheal intubation" (ATI). It consists of many strategies designed to effectively secure the airway of patients whose medical history may indicate that their airway care would be challenging. Awake tracheal intubation continues to be the gold standard due to its low risk profile and high success rate in managing the expected difficult airway.[1]

The better safety profile of ATI over procedures involving a profoundly sedated or anesthetized patient is supported by its capacity to secure the airway of a patient who retains their intrinsic airway tone. Many methods are included under the umbrella term "ATI." In the past, ATI was most frequently carried out using a flexible bronchoscope (ATI:FB); more recently, ATI using videolaryngoscopy (ATI:VL) has become a standard procedure. When both are viable, no single approach has been shown to be better than the other, with the exception of individuals who have very restricted tongue, neck, or mouth opening. In certain circumstances, ATI:FB could be the better option. A dual approach that requires both a bronchoscope and a videolaryngoscope, known as video-assisted flexible/fibreoptic intubation (VAFI), has also gained popularity. Although front-of-neck airway and awake tracheostomy intubation are also included in the term "ATI," this article will concentrate on traditional tracheal tube intubation.[2–4]

Any patient who has risk indicators for difficult face mask breathing or tracheal intubation, whether from underlying medical conditions or as a result of presenting pathology, should be evaluated for ATI.[5]

A asleep method may be seen more acceptable in situations of recognized difficult laryngoscopy and tracheal intubation, if facemask ventilation is feasible. It is helpful to hone these abilities for the treatment of the unexpected difficult airway. The patient's unwillingness to receive ATI, even after providing a suitable justification, is the only absolute contraindication. An allergy to local anaesthetic, airway bleeding (where blood may obscure the image obtained through a flexible bronchoscope or videolaryngoscope), an uncooperative patient, and certain airway tumors (which may cause a "cork-in-bottle" airway obstruction) are examples of relative contraindications.[2]

The 4th National Audit Project (NAP4) suggested that all anesthetic departments require this expertise because to the increased rates of morbidity and death among patients with expected problematic airways who should have had ATI. Even said, ATI rates are still low—roughly 0.2% of all anesthetics—and new data indicates that, after accounting for variations in activity during the coronavirus disease 2019 (COVID-19) pandemic, they will drop by 50% between 2014 and 2020. The Difficult Airway Society (DAS) released adult ATI guidelines in 2019 with the goal of enhancing patient safety, uptake, and accessibility. These guidelines mainly focus on two important techniques: videolaryngoscopy or flexible bronchoscopy. Other methods do, however, exist and have proven effective.

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

Criteria for Eligibility

For the purpose of this literature review, we review published literature contains the effects for airway devices on patients with awake tracheal intubation. This is done to provide an explanation and improve the handling of treatment at the patient. As the main purpose of this paper, to show the relevance of the difficulties that have been identified as a whole.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2013, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

Search Strategy

We used "airway device" and “awake tracheal intubation” as keywords.The search for studies to be included in the systematic review was carried out using the PubMed and SCIENCE DIRECT databases by inputting the words: *(("airway"[All Fields] OR "airway s"[All Fields] OR "airways"[All Fields]) AND ("device s"[All Fields] OR "equipment and supplies"[MeSH Terms] OR ("equipment"[All Fields] AND "supplies"[All Fields]) OR "equipment and supplies"[All Fields] OR "device"[All Fields] OR "instrumentation"[MeSH Subheading] OR "instrumentation"[All Fields] OR "devices"[All Fields]) AND (("awake"[All Fields] OR "awakeness"[All Fields] OR "awakes"[All Fields] OR "awaking"[All Fields]) AND ("intubation, intratracheal"[MeSH Terms] OR ("intubation"[All Fields] AND "intratracheal"[All Fields]) OR "intratracheal intubation"[All Fields] OR ("tracheal"[All Fields] AND "intubation"[All*

Fields]) OR "tracheal intubation"[All Fields]))) AND *((clinicaltrial[Filter])* AND *(2014:2024[pdat]))* used in searching the literature.

Data retrieval

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and can't have been seen anywhere else.

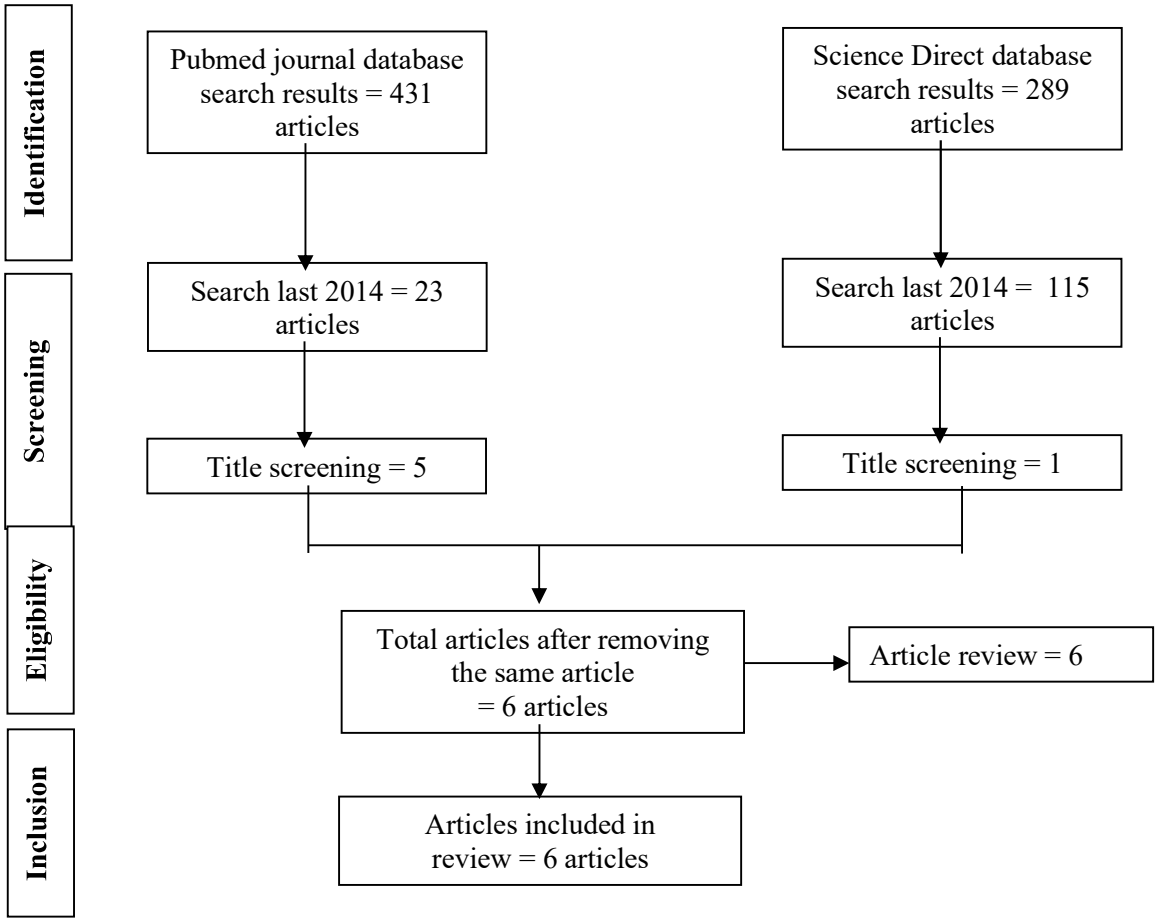

Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

Quality Assessment and Data Synthesis

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

In the PubMed database, the results of our search brought up 431 articles, whereas the results of our search on SCIENCE DIRECT brought up 289 articles. The results of the search conducted for the last year of 2014 yielded a total 23 articles

for PubMed and 115 articles for SCIENCE DIRECT. In the end, we compiled a total of 6 papers, 5 of which came from PubMed and 1 of which came from SCIENCE DIRECT. We included six research that met the criteria.

Khalifa[6] (2015) showed that the use of a facilitated technique reduced the time to visualize the vocal and the overall time of nasotracheal intubation with less need for facilitating maneuvers and higher first attempt success. The aScope 2 demonstrated a high success rate in awake nasotracheal intubation in patients with anticipated difficult airway.

Cheng, et al[7] (2021) showed that when it came to adult head and neck surgery patients with predicted difficult airways, awake nasal intubation in the shikani optical stylet (SOS) group took a lot less time and airway-assisted techniques than in the fiberoptic bronchoscope (FOB) group.

Yadav, et al[8] (2021) showed that airway nerve blocks (bilateral superior laryngeal and transtracheal recurrent laryngeal) offer quicker intubation, proper airway anesthetic, and reduced patient pain during AFOI in patients with a potentially difficult airway as compared to topical anesthetic administered using an atomizer. Compared to topical anesthetic applied with an atomizer, upper airway nerve blocks allow for speedier intubation, sufficient airway anesthesia, and reduced patient pain to support AFOI in patients with expected difficult airways.

Table 1. The litelature include in this study

Author	Origin	Method	Sample	Result
Khalifa, 2015[6]	Egypt	Randomized controlled study	50 patients	With a greater first try success rate in the aided group, the total success rate of scope-guided intubation was 84% and 92% in the control and facilitated groups, respectively. The assisted group had a substantial reduction in both Tvc and total nasotracheal intubation time (156 ± 0.81 and 198.6 ± 0.82 s) when compared to the control group (201.6 ± 1.15 and 244.8 ± 1.15 s).
Cheng et al, 2021[7]	China	Randomized clinical trial	50 patients	The FOB group experienced tracheal intubation in an average of 74 seconds (57–108) and the SOS group 38 seconds (27–60) (P <.001). The FOB and SOS groups had initial success rates of 96% and 92%, respectively, for intubations (P >.999). Compared to 21 (84%) FOB intubations, airway aided procedures were needed in six (24%) SOS intubations (P <.001). The rates of oxygen desaturation and intubation-related postoperative complications did not significantly differ across the groups.
Yadav et al, 2021[8]	India	Randomized clinical trial	50 patients	Group A had a considerably shorter intubation time (63.80±7.86 seconds) than Group B (184.96±13.38 seconds) (p=0.0001). Patients who had airway blocks had superior intubation conditions, ease of intubation, and patient comfort. Compared to Group A, Group B experienced more instances of coughing and

				gagging. In comparison to group B, group A exhibited superior hemodynamics and fewer desaturation events.
Chavan et al, 2020[9]	India	Randomized clinical trial	60 patients	This research included sixty patients, split into two groups, who were sent for Commando operations and had an ASA I or II Mallampatti score of three or above. Group AB (Airway Block, n = 30) received Inj 2% Lignocaine for recurrent laryngeal nerve block transtracheally as well as bilateral superior laryngeal nerve block. Using an ultrasonic nebulizer, 4% lidocaine was used to nebulize the airways of 30 patients in the second group of AN (Airway Nebulization). Hemodynamic and demographic data were similar among the groups. Compared to group AN, the intubation time, patient comfort score, and intubation circumstances were all better in the AB group. The AN Group had airway issues such as cough and laryngospasm.
Mohanta et al, 2021[10]	India	Prospective randomized study	60 patients	The group that underwent ultrasound guided airway nerve blocks took 69.27±21.85 seconds for intubation, but the group that underwent ultrasonic nebulization with lignocaine took 92.43 ± 42.90 seconds (p = 0.015). Throughout the process, hemodynamic variables altered, although the values in both groups were similar. The number of tries, comfort score, and cough and gag reflexes did not differ statistically between the two groups. This study demonstrates that when a patient receives ultrasound guided airway nerve block instead of ultrasonic nebulization for airway anesthesia, a much shorter amount of time is needed to accomplish awake fiberoptic intubation.
Singh et al, 2018[11]	Nepal	Randomized clinical study	30 patients	The nerve blocks group required considerably less time for awake fiberoptic intubation than the atomizer group [Group N: 90.2±11.7 secs and Group A: 210.4±10.6 secs

				(p=0.041)]. Compared to the nerve block group, the atomizer group experienced more coughing and choking episodes [Group N: 1 patient, Group A: 11 patients (p=0.006)]. In the nerve block group, intubation ease and patient comfort were noticeably greater. The two groups' hemodynamic and demographic characteristics were similar.

Chavan, et al[9] (2020) showed that for fiberoptic aided naso-tracheal intubations, simultaneous airway nerve blocks offer ideal intubating circumstances with the requisite hemodynamic stability, optimum patient comfort, and least amount of sedation needed. When a difficult intubation is predicted, the judicial use of combined airway blocks, such as bilateral superior and trans-tracheal recurrent laryngeal nerve blocks, may help achieve a successful, little complication awake naso-tracheal intubation.

Mohanta, et al[10] (2021) showed that ultrasonic lignocaine nebulization required a lot longer time to intubate than ultrasound guided nerve blocks, but there were no appreciable variations in the cough gag reflex, ease of intubation, hemodynamic changes, or postoperative problems. The results of this study are significant because they support the recommendation of the worldwide medical scientific community to use ultrasound guided airway block for awake fiberoptic guided intubation whenever possible.

Singh, et al[11] (2018) showed that compared to topical anesthesia using an atomizer, the nerve blocks (bilateral superior laryngeal and transtracheal recurrent laryngeal) provide adequate airway anesthesia, less patient discomfort, and faster intubation to aid in awake fiberoptic intubation in patients with anticipated difficult airway.

DISCUSSION

Any procedure that involves inserting an endotracheal tube (ETT) into a patient who is conscious, breathing on their own, and able to follow instructions is referred to as "awake tracheal intubation" (ATI). In terms of addressing the anticipated problematic airway, it is regarded as the gold standard. Concerns about facemask breathing, supraglottic placement, tracheal intubation, or front of neck access might be the source of this challenge. The literature, institutions, and cultural practices all have different specific indications for different conditions. These include, but are not limited to, head and neck pathology, which includes tumors, radiation therapy, and previous surgery, hemodynamic instability, cervical spine pathology, gastric aspiration risk, and elevated body mass index (BMI).

As fiberoptic technology advanced and became more widely accessible, AFOI rose. Even though there are now many methods for intubating a non-anesthetized person, the traditional narrative of AFOI being the "gold standard" for handling the expectedly difficult airway has altered. The DAS guidelines designate ATI, not AFOI, as the gold standard, shifting the focus from the intubation technique to its application on a patient who is compliant and breathing on their own. AFOI has a success rate of around 99% and a 1–10% complication rate. One can administer AFOI orally or nasally. Restrictions on mouth opening and surgical access may require nasal intubation, which may be simpler to learn since the posterior nasopharynx aligns the glottis and scope more favorably.[12]

There is a severe learning curve with AFOI. Though the exact number needed to be competent is uncertain, it is thought to be between 10 and 25, as opposed to six with a videolaryngoscope. Since videolaryngoscopy is becoming more widely available, the majority of anesthetists are more comfortable and knowledgeable about using it. Moreover, AVL can provide a larger screen, enhanced spatial awareness, a wider field of vision, the ability to directly visualize and suction secretions, no red-out phenomenon when touching mucosa, and, most importantly, the ability to visualize the tube's passage through the glottis—a benefit that is especially beneficial for people with periglottic pathology. This makes it easier to modify the ETT's size or kind without having to start the process over. Compared to its direct equivalents, videolaryngoscopes require less traction and effort to align the laryngeal and pharyngeal structures. They can be divided into channeled and unchanneled.[13–15]

This method describes a mix of both AVL and AFOI and has been described for difficult intubations in patients under anesthesia. While the videolaryngoscope widens the airway and visualizes all or part of the glottis, the flexible bronchoscope passes either nasally or orally. By offering a wider glottic view, visualizing the passage of the ETT, and cutting down on the amount of time needed for bronchoscopic intubation, awake VAFI may be able to overcome the drawbacks of both AVL and AFOI. It also requires less force from the videolaryngoscope because the bronchoscope

travels around the epiglottis without the structures being aligned. Furthermore, since both methods are tolerable, their combination shouldn't require any further preparation or anesthesia. Only case reports or case series were found in the literature we searched.[16]

In the context of ATI, FBs, OSs, and channelled and unchannelled VLs are clinically equivalent airway devices in terms of first-pass success rate, rate of problems, and rate of side effects. With OSs, the TTI was the smallest, while with FBs, the longest. Thus, when an ATI is recommended, OSs and channelled and unchannelled VLs are appropriate substitutes for FBs and ought to be taken into account.

CONCLUSION

In summary, in the context of awake tracheal intubation, flexible bronchoscopes, optical stylets, and channelled and unchannelled videolaryngoscopes were clinically equivalent airway devices. The time to tracheal intubation was longest with flexible bronchoscopes and shortest with optical stylets.

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