English

Potentialities and Challenges of AI in Pediatric Airway Management: An Integrative Review

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Abstract

Objective: To synthesize current knowledge regarding the application of Artificial Intelligence (AI) in the airway management of critically ill pediatric patients.**Methods:** An integrative review (PRISMA 2020) of original and review articles (from 2015 to April 6, 2026), in Portuguese, English, or Spanish, focused on pediatric patients (one month to 18 years old). A search was conducted on PubMed, Scopus, and LILACS (April 2025 to April 2026) to answer the question: "Do AI tools assist in the airway approach of critically ill children?" **Results**: 12 articles were selected: five Cohort/observational studies and seven reviews. The studies addressed AI in the pre-, intra-, and post-management phases.**Conclusions**: AI represents a paradigm shift in pediatric difficult airway management, moving towards predictive and individualized care. Evidence suggests broad applicability across all phases, making the development and dissemination of tools crucial to prevent inadequate management and optimize prognosis. AI can be an indispensable support for clinical decision-making, enhancing the safety and efficacy of human judgment, but ethical barriers to its use must be considered. Further robust studies should be conducted to contribute to the literature on the subject.

Key-words: Pediatrics; Intratracheal Intubation; Airway Management; Artificial Intelligence.

Resumen

Potencialidades y Desafíos de la IA en el Manejo de la Vía Aérea Pediátrica: Una Revisión Integradora

Objetivo: Sintetizar el conocimiento actual sobre la aplicación de la Inteligencia Artificial (IA) en el manejo de la vía aérea en pacientes pediátricos en estado crítico.**Métodos:** Revisión integrativa (PRISMA 2020) de artículos originales y de revisión (de 2015 al 6 de abril de 2026), en portugués, inglés o español, centrada en pacientes pediátricos (de un mes a 18 años). Se realizó una búsqueda en PubMed, Scopus, y LILACS (abril 2025 a abril 2026) para responder a la pregunta: "¿Ayudan las herramientas de IA en el manejo de la vía aérea en niños críticamente enfermos?" **Resultados:** Se seleccionaron 12 artículos: cinco estudios de cohorte/observacionales y siete de revisión. Los estudios abordaron la IA en las fases pre, intra y posmanejo.**Conclusiones**: La IA representa un cambio de paradigma en el manejo de la vía aérea difícil en pediatría, migrando hacia una asistencia predictiva e individualizada. La evidencia sugiere una amplia aplicabilidad en todas las fases, lo que hace crucial el desarrollo y la difusión de herramientas para prevenir un manejo inadecuado y optimizar el pronóstico. La IA puede ser un soporte indispensable para la decisión clínica, mejorando la seguridad y eficacia del juicio humano, pero deben considerarse las barreras éticas para su uso. Se deben realizar más estudios robustos para contribuir a la literatura sobre el tema.

Palabras clave: Pediatría; Intubación Intratraqueal; Manejo de la Vía Aérea; Inteligencia Artificial.

Resumo

Potencialidades e Desafios da IA no Manejo da Via Aérea em Pediatria: Uma Revisão Integrativa

Objetivo: Sintetizar o conhecimento atual sobre a aplicação de Inteligência Artificial (IA) no manejo de vias aéreas pediátricas em estado grave.**Métodos:** Revisão integrativa (PRISMA 2020) de artigos originais e de revisão (2015 a 6 de abril de 2026), em português, inglês ou espanhol, focada em pacientes pediátricos (um mês a 18 anos). Busca na PubMed, Scopus e LILACS (abril de 2025 a abril de 2026) para responder: "As ferramentas de IA auxiliam na abordagem das vias aéreas em crianças criticamente enfermas?".**Resultados:** 12 artigos foram selecionados: cinco Coorte/observacional e sete de revisão. Os estudos abordaram a IA nas fases pré, intra e pós-manejo.**Conclusões:** A IA representa uma mudança paradigmática no manejo da via aérea difícil em pediatria, migrando para uma assistência preditiva e individualizada. As evidências sugerem ampla aplicabilidade em todas as fases, tornando crucial o desenvolvimento e disseminação de ferramentas para prevenir manejo inadequado e otimizar o prognóstico. A IA pode ser um suporte indispensável à decisão clínica, aprimorando a segurança e eficácia do julgamento humano, mas deve-se considerar as barreiras éticas para a sua utilização. Mais estudos robustos devem ser realizados de forma a contribuir para a literatura sobre o tema.

Palabras-chave: Pediatria; Intubação intratraqueal; Manuseio das vias aéreas; Inteligência artificial

INTRODUCTION

Artificial Intelligence (AI) has experience significant advancements in recent years, becoming a valuable tool in medicine across various fields[1,2,3]. It includes distinct subfields such as machine learning (ML), deep learning (DL), and computer vision (CV)[1,2,3]. ML consists of algorithms that can learn patterns from data to make predictions. DL, a subset of ML, uses deep neural networks to analyze complex data, particularly images and signals[2,3]. CV, on the other hand, enables the automated interpretation of images and videos, offering relevant applications in anatomical analysis and support for medical procedures[2].

Difficult intubation, defined by criteria such as Cormack-Lehane Grade III or IV and three or more attempts, has an incidence of 0.28% in children aged 0 to 15 years[4]. For children with difficult airways, the need for a surgical airway is 2%[4]. Also, difficult bag-mask ventilation (DBMV) is reported in 6.6% of healthy children between 0 and 8 years old, a rate considerably higher than in adults (1.5%)[5]. The overall incidence of difficulty with mask ventilation and/or endotracheal intubation in apparently normal patients is 5.8%[6].
Thus, considering that airway management is a primary focus in pediatric urgent and emergency care settings and during anesthetic procedures, the ability to address the anatomical and physiological challenges inherent to the pediatric age group is essential[4,5]. Respiratory complications are frequently encountered in critically ill children[4,5].

Critical anesthesia-related events, specifically the inability to intubate and oxygenate, while less frequent, carry a risk of mortality and necessitate immediate intervention [4]. However, there is a high rate of failure associated with a lack of procedural standardization, limited equipment availability, inadequate knowledge, and insufficient training[4]. Based on this, enhancing airway management skills, particularly in critically ill children, becomes essential to prevent adverse outcomes and unfavorable prognoses [4,5,7].
Given current technological advancements, AI can be used as a decision-support tool to enhance the quality of care, ensuring safer and more efficient patient management[7]. There are potential applications for AI in pediatric airway management, ranging from preoperative risk assessment and the selection of optimized devices to the prediction of adverse events and procedural assistance [5, 7, 8]. The availability of simulation and virtual reality devices enables healthcare professionals to undergo training, contributing to improved clinical outcomes[4, 6]. Despite these benefits associated

with the use of AI, its advancements in the pediatric setting have not been as significant as those observed in adults. Consequently, there is a need for further validation and feasibility testing to confirm or refute the clinical applicability of these tools[7]. In light of the importance of this topic, this article aims to provide a synthesis of current knowledge regarding the use of AI in the airway management of critically ill children, based on an integrative literature review.

METHODOLGY

This is an integrative review study following the PRISMA 2020 checklist[9]. Articles published between 2015 and April 6, 2026, in Portuguese, English, or Spanish that addressed the pediatric age group (from one month to 18 years old) were included. Literature reviews and original articles were selected if they addressed the guiding question: “Do artificial intelligence tools assist in airway management in critically ill children?” We defined airway management as any intervention involving a clinical practice, ranging from training, patient positioning, and oxygen delivery to the performance of orotracheal intubation (OTI). Studies that did not meet these criteria were excluded. Additional exclusion criteria included a focus exclusively on adults, the neonatal age group, or dental procedures. The databases used were PubMed, Scopus, and LILACS. The search strategy included the following descriptors combined using Boolean operators: (“artificial intelligence” OR “machine learning” OR “deep learning”) AND (“airway management” OR “difficult airway” OR “tracheal intubation”) AND (“pediatric” OR “children”). The selection process followed the four stages of the PRISMA method: 1. Identification of records in the databases; 2. Screening and removal of duplicates through independent analysis of titles and abstracts; 3. Eligibility assessment, involving full-text reading to apply exclusion criteria; and 4. Inclusion, resulting in a final sample of 12 articles. The texts were identified and evaluated manually between April 2025 and April 2026 by four reviewers.The initial assessment was based on an analysis of titles (excluding any that did not address artificial intelligence in medicine), and subsequently based on abstracts. Once this stage was complete, the articles were read in full, selected, and analyzed, considering the established age range and the use of artificial intelligence as an aid mechanism for tracheal intubation.The level of evidence was classified according to the Joanna Briggs Institute (JBI), which categorizes studies based on their methodological design and scientific rigor, and according to the STROBE checklist for observational studies. The objective of this search was to critically evaluate the applicability and relevance of using AI in airway management for critically ill pediatric patients

RESULTS

We initially identified 13 articles in PubMed, 21 in Scopus, and 19 in LILACS via BVS. Figure 1 was prepared following the PRISMA 2020 strategy (9) and illustrates how each stage of the search was conducted across the databases.

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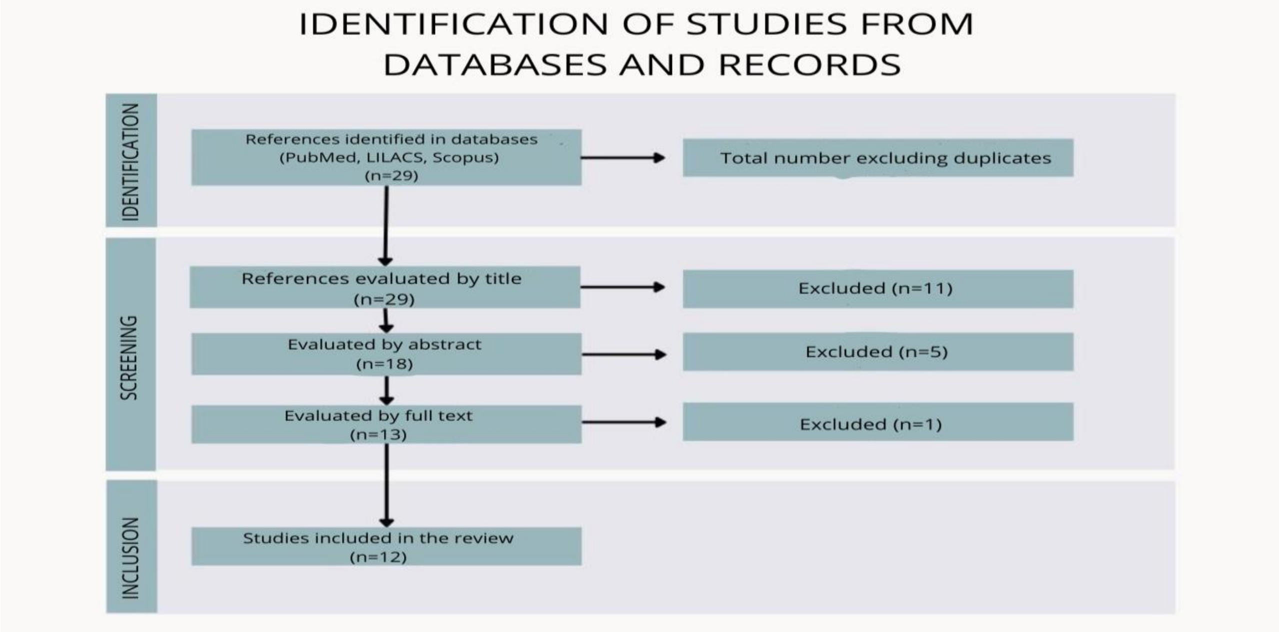
Figure 1 - Identification of studies from databases and registries.



Source: Prepared by the authors.

Table 1 summarizes data regarding authors and year of publication, the institution where the study was conducted, publication type, methodological characteristics, JBI level of evidence, and the number of items in accordance with STROBE. Six of the 12 selected articles are original observational or cohort studies (predominantly retrospective for ML), and six are review studies (narrative or structured).

Table 2 summarizes the results from each of the selected texts. Six articles highlighted the use of predictive models to calculate the ideal size and depth of the endotracheal tube; predict the immediate need for intubation upon hospital arrival in trauma cases; and anticipate intraoperative adverse events, such as hypoxemia or ventilation failure. Four studies associated CV with greater anatomical precision, providing real-time assistance and structural identification during videolaryngoscopies and bronchoscopies. Finally, other potential applications of AI included data automation and optimization, and the employment of cross-cutting technologies, such as the creation of complex anatomical models via 3D printing, enabling high-fidelity simulations and team training for real-world emergency scenarios.

Table 1 - Authors, year of publication, study institution, publication type, scientific rigor, level of evidence, and methodological quality of the 14 selected articles.

Authors/Year of publication	Study Institution	Publication Type	Methodological Characteristics	JBI Level of Evidence	Number of items in accordance with STROBE
Matava *et al.* (2020a) (7)	The Hospital for Sick Children, Toronto, Canada	Narrative Review	A search was conducted in the Ovid Medline, PubMed, and IEEE databases. The articles were manually reviewed for relevance.	5.c	-
Matava *et al.* (2020b) (10)	The Hospital for Sick Children, Toronto, Canada	Retrospective Observational Study	Development of a Convolutional Neural Network (CNN) using 775 videolaryngoscopy and bronchoscopy images to classify anatomy in real time.	3.e	24 in 32
Lonsdale *et al.* (2020) (8)	Johns Hopkins All Children's Hospital, United States	Narrative Review	Analysis of the literature on machine learning in pediatric research, with examples in critical care, transfusion medicine, and anesthesiology.	5.c	-
Kim *et al.* (2023) (11)	All India Institute of Medical Sciences, Jodhpur, India	Retrospective Cohort Study	A search was conducted in electronic databases (Google Scholar, Cochrane, PubMed), yielding 3,200 articles. Following screening and the application of criteria, 12 articles were included for analysis. The selection process was documented using a PRISMA flowchart.	3.b	30 in 32

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Hsu *et al.* (2020) (5)	Children´s Hospital of Philadelphia, University of Pennsylvania	Narrative Review	The article summarizes recent scientific literature, introduces new devices and techniques, and highlights innovations (POCUS, 3D printing, AI) in the management of the difficult pediatric airway.	5.c	-
Haag *et al.* (2024) (4)	Inselspital, Bern University Hospital, Switzerland	Narrative Review	Systematization of data and animal models (8 relevant studies) for emergency front-of-neck airway access (eFONA) in pediatrics, addressing the influence of 3D simulators and AI.	Nível 5.c	-
Sullivan et al. (2024) (12)	University of Utah, United States	Retrospective Cohort Study	Data collection over 23 months at four pediatric trauma centers, utilizing an artificial intelligence model to predict the need for intubation in the emergency department in injured children and adolescents.	Nível 3.b	26 in 32
Galvez *et al.* (2017) (13)	The Children's Hospital of Philadelphia, University of Pennsylvania Perelman School of Medicine, United States	Retrospective Observational Study	Selection of ASA 1 and 2 patients undergoing common procedures, balanced groups: comprising 300 patients per device type, with data collected automatically and statistically analyzed using the MATLAB R2015b package for classification and implementation of the artificial intelligence algorithm.	Nível 3.e	24 in 32
Shim *et al.* (2023) (14)	Kangbuk Samsung Hospital e Chung-Ang University (South Korea)	Retrospective Cohort Study	A retrospective cohort study involving 1,436 patients, divided into training (70%) and testing (30%) sets. It validated the Elastic Net model using 5-fold cross-validation against formula-based methods.	3.b	27 in 32

Madadi *et al.* (2025) (15)	Shahid Beheshti University of Medical Sciences (Irã) e Harvard Medical School (United States)	Narrative Review	A narrative clinical review focused on the integration of AI models into pediatric anesthesiology. It discusses perioperative applications and ethical challenges, without a documented strict systematic search.	5.c	-
Nakamura *et al.* (2025) (16)	Kouseikai Takai Hospital and Gifu Prefectural General Medical Center (Japan)	Retrospective Observational Study	A retrospective study for the development of a Machine Learning model (YOLOv8n). It utilized 1,197 images from 653 videos for training/validation and 399 images for empirical testing.	3.e	24 of 32
Shah *et al.* (2026) (17)	College of Medicine, Central Michigan University (United States)	Narrative Review	A structured narrative review, employing a systematic search across four databases (EBSCO, PubMed, Scopus, Web of Science) and applying the PICO framework and the PROBAST tool to assess bias in 11 included studies.	5.c	-

Table 2 - Summary of results considering the use of AI in the management of difficult airways in children.

Authors/Year of Publication	Relevance
Matava et al. (2020a) (7)	The findings of the review highlight the potential of AI on several fronts: in diagnosis, utilizing facial analysis to predict difficult intubations and neural networks to detect airway obstructions; in procedural assistance, with algorithms that identify anatomy in real time during laryngoscopies; and in predicting outcomes such as hypoxia, although the review notes a scarcity of research focused specifically on pediatric airway outcomes. It was concluded that AI holds great potential to assist clinicians in overcoming challenges, but it should be viewed as a support tool that does not replace clinical judgment.

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Matava et al. (2020b) (10)	Convolutional Neural Networks (ResNet and Inception) demonstrated high sensitivity (>0.86) and specificity (>0.97) in the real-time classification and labeling of vocal cords and tracheal rings from laryngoscopy/bronchoscopy, serving as an aid for operators managing difficult airways.
Lonsdale *et al.* (2020) (8)	It demonstrates the expanding application of machine learning for predicting the need for Pediatric Intensive Care Unit admission, extubation failure, and complex intraoperative prediction, indicating continuous improvement in predictive models compared to traditional scores (such as PEWS).
Kim *et al.* (2023) (11)	The GBRT model, trained solely on demographic data (age, weight, height), demonstrated impressive accuracy in predicting size and depth (absolute error of 0.7 cm), far surpassing conventional heuristics and traditional age-based pediatric formulas.
Hsu *et al.* (2020). (5)	The study's key findings underscore the importance of hybrid techniques—such as the combined use of videolaryngoscopy and flexible bronchoscopy—and the transformative role of new technologies. Point-of-care ultrasound (POCUS) proved to be a versatile tool for assessing tube size, confirming tube placement, identifying the cricothyroid membrane, and analyzing gastric contents. Furthermore, the study highlights 3D printing as a resource for preoperative simulation, and artificial intelligence (AI) for predicting difficult intubations and providing real-time procedural guidance. The conclusion is that, while hybrid techniques remain crucial, the future of pediatric airway management will be profoundly impacted by innovations such as POCUS, 3D printing, and AI—technologies that promise to significantly enhance safety and clinical planning.
Haag *et al.* (2024) (4)	It addresses the potential of AI in the management of difficult airways in pediatrics—specifically in assisting with the recognition of airway anatomy during intubation, and in the decision-making process regarding pressure, for instance, through the analysis of vital signs and the identification of hypoxia.
Sullivan *et al.* (2024) (12)	The AI model utilized demonstrated a strong capacity to predict the need for emergency intubation in children following trauma, proving useful for early decision-making by reducing unnecessary intubations and potentially fatal delays.
Galvez *et al.* (2017) (13)	The developed system, utilizing artificial intelligence, can be used to assist in the automated documentation of data during surgeries, reducing alarm fatigue by improving the accuracy of detecting changes in ventilation. It can serve as a clinical decision support system.

Shim *et al.* (2023) (14)	Using an Elastic Net model powered by baseline data (age, sex, weight, and height), the AI predicted the optimal tube depth with a malposition rate of just 17.9%, compared to rates ranging from 35.7% to 62.2% for methods based on age, stature, and tube size. The model addresses a direct consequence of managing short and difficult airways: either excessively deep (endobronchial) intubation or failure to intubate. Reducing the need for multiple repositioning attempts minimizes trauma, glottic edema, and the aggravation of a previously challenging airway status in children.
Madadi *et al.* (2025) (15)	In extreme scenarios, the integration of AI-guided computer vision into ultrasound holds the potential to assist the anesthesiologist in recognizing anatomy for emergency surgical access (eFONA). However, most of these visual models for anatomical prediction have not yet been specifically validated in the pediatric age group.
Nakamura *et al.* (2025) (16)	The AI successfully recognized the airway even under suboptimal conditions, such as limited visibility of the arytenoid cartilages or epiglottis in infants. However, the AI demonstrated vulnerabilities in scenarios involving complicating airway factors: detection failed in the presence of excessive blood or secretions, or when bougies obstructed the view; furthermore, there was a critical risk of the AI erroneously identifying the esophageal orifice as the larynx.
Shah *et al.* (2026) (17)	The study warns that current AI tools pose a high risk of algorithmic bias when encountering anatomically abnormal or difficult airways. Since most models were trained on highly homogeneous populations, AI accuracy may drop drastically when dealing with patients who have craniofacial constraints or anatomical variations distinct from those present in the original dataset.

Table 3 - Main applications, details of use, and clinical benefits of using AI in pediatric airway management during the pre-manipulation, post-manipulation, and general phases.

Phase of Care	AI / Technology Application	Usage Details	Primary Clinical Benefit
Pre- and Intra-handling	**Facial Analysis and Computer Vision**	Prediction of a difficult airway through the analysis of facial characteristics.	Anticipation of difficult intubations for better planning.

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	3D Modeling and Printing	Use of software powered by radiological images to create anatomical models of organs and airways in less than 5 minutes.	Planning of complex surgeries (tumors, anomalies) using customized devices.
	Predictive Algorithms (Machine Learning)	Risk assessment (e.g., need for intubation in trauma, adverse respiratory events).	Early triage and reduction of unnecessary intubations.
	Real-Time Assistance (CV)	Identification of anatomical structures during laryngoscopy and bronchoscopy.	Guidance during the procedure and increased safety.
	Anesthesia Decision Support	Optimization of tube size/depth selection and estimation of anesthetic depth using ML.	Reduction of complications related to equipment handling.
	Intelligent Monitoring	Vital signs analysis to predict hypoxia/hypoxemia and automated data documentation.	Rapid detection of physiological changes and reduction of "alarm fatigue."
	POCUS + AI	Point-of-care ultrasound to confirm tube position and identify the cricothyroid membrane.	Immediate and secure confirmation of airway placement.
Post-handling	**Failure Prediction**	Analysis of subtle physiological patterns to predict extubation failure and non-invasive ventilation (BiPAP) failure.	Prevention of unplanned reintubation and early intervention.
General / Cross-cutting	**Education and Training**	Gamification and realistic simulation with mannequins.	Enhancement of the professionals' technical skills. Familiarization of the children

			with the processes to be carried out.

Source: The authors, based on the findings of the integrative review.

DISCUSSION

This integrative review synthesized current knowledge regarding the use of AI in airway management in critically ill children. A general analysis reveals that this technology can be used as a teaching tool for surgical and anesthetic techniques, as well as throughout the entire perioperative period of airway management, from the preoperative phase through to postoperative care. Its most concrete application has been in the prediction of risk factors and in planning the airway management approach for pediatric patients. AI models have demonstrated the capability to predict difficult intubations through facial analysis [5, 10], anticipate the need for emergency intubation in trauma patients immediately upon admission (12), and predict with high accuracy the optimal endotracheal tube size to be used [11, 14]. An ML model based on regularized regression, evaluated by Shim et al., was capable of reducing the risk of inappropriate intubation depth from 62.2% to just 17.9%[14]. Predictive algorithms have also demonstrated success in anticipating adverse events, such as predicting intraoperative hypoxemia minutes in advance [15].

Another proven application of AI is procedural assistance. Computer vision is usede to identify a child's anatomy in real time during laryngoscopies. In an observational study, Matava et al. demonstrated the applicability of convolutional neural networks (CNNs) that classify vocal cords and tracheal rings in real time during videolaryngoscopy and bronchoscopy, achieving high sensitivity (0.86) and specificity (0.98).[10]An article by Nakamura et al. demonstrated that the YOLOv8n model was capable of detecting the larynx in infants with an Area Under the Curve (AUC) of 0.91, while noting potential technical errors in identifying the esophagus due to anatomical proximity.[16] Meanwhile, studies by Haag et al. and Hsu et al. demonstrated AI's capacity to assist in the reconstruction of radiological images to create detailed 3D anatomical models, enhancing the planning of complex surgical cases and preparation for emergency cervical access procedures.[4,5]

In addition to these applications, Gálvez et al. demonstrated that AI systems can be used to automatically detect the specific airway technique currently in use (invasive versus non-invasive) via the respiratory monitor.[13] Upon analysis, it was concluded that this approach, beyond automating documentation, reduces auditory fatigue caused by alarms and improves accuracy in detecting changes in ventilatory patterns.[13] Another application, documented by Madadi et al., involved the adoption of “digital twins” (virtual replicas of physical processes, powered in real time by AI) and virtual reality gamification. These tools were used both for training physicians in the technical skills required for airway management and for patient education, helping children become more familiar with the pre-, peri-, and post-surgical process, reducing anxiety and leading to improved outcomes.

However, an analysis of the selected articles revealed that there remains a need for substantial investment in the application of AI within the pediatric setting. Artificial intelligence (AI) offers a wide range of potential applications. Nevertheless, the results highlight a widely recognized limitation regarding its widespread implementation in bedside pediatric clinical and surgical practice [7, 8, 15, 17]. Shah et al. point to an overabundance of retrospective, single-center studies and a significant lack of formal external validation[17]. Madadi et al. also identified the scarcity of demographically diverse databases as a barrier, creating a risk of population-based algorithmic bias[15]. Lonsdale et al. and Shah et al. underscore the need for demonstrated safety, model transparency, and clear bioethical guidelines for the use of AI in clinical practice[8, 17]. Recent literature confirms the potential of this technology, with applicability spanning all phases of clinical decision-making: in planning, by enabling rapid and accessible 3D anatomical reconstructions for complex cases; during management, by providing real-time support for anatomical identification and device optimization; and in the post-management phase, by anticipating complications, such as extubation failure, through the analysis of physiological data. Based on the data presented herein, the current study contributes to the literature by offering a synthesis

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of current knowledge, derived from relevant international databases, regarding the use of Artificial Intelligence (AI) in the management of pediatric airways in critically ill patients. This knowledge holds the potential to support various medical professionals, including anesthesiologists, emergency physicians, and pediatric surgeons.

This synthesis becomes even more relevant when considering that difficult intubation occurs in 0.28% of pediatric patients, with a higher prevalence observed in children under one year of age[18].This study has several limitations. As limiting factors, we identified the inclusion of a limited number of texts, despite searches across three databases; the low level of evidence in the majority of the included articles; and the inclusion criterion restricting the scope to original research or review articles available only in English, Portuguese, or Spanish. Articles focusing exclusively on the neonatal age group were also excluded. This is an age group prone to difficult intubations that could potentially benefit from the use of AI[18]. Beyond these methodological constraints, the application of Artificial Intelligence (AI) in clinical practice raises significant ethical and regulatory considerations. Central among these concerns are the potential for algorithmic bias, the limited generalizability of models trained on specific population groups, and the lack of clear guidelines for defining clinical accountability in scenarios involving AI-assisted decision-making. Consequently, rigorous external validation and the establishment of appropriate regulatory frameworks are imperative, serving as essential prerequisites for large-scale implementation.

CONCLUSION

The integration of Artificial Intelligence (AI) into the management of difficult airways in pediatrics is emerging as a game-changer, transforming the paradigm from a reactive approach to a predictive and highly personalized model. However, the translation of these innovations from the realm of research into routine clinical practice is hindered by notable challenges. The generalizability of current results is limited by a lack of robust external validation and by the imperative need for algorithms developed specifically using pediatric data to avoid biases originating from adult models. In light of this, the future of pediatric airway management will be characterized by multimodality, grounded in the synergy between hybrid techniques, POCUS (Point-of-Care Ultrasound), and advanced computational tools. Within this ecosystem, AI assumes the role not of a substitute but rather of an indispensable decision-support system, thereby enhancing the safety and efficacy of human clinical judgment. Therefore, it is crucial to increase investment in research projects within this field, prioritizing the execution of high-quality prospective studies.

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