



CAS 2026

Education and Simulation Abstracts

Contents

A scoping review on definitions and current applications of coaching in anesthesiology medical residency programs	3
An expert-informed, pilot-tested bilingual survey to assess AI learning needs in Canadian anesthesiology training	5
Characteristics of good clinical teachers in anesthesiology and surgery from the perspectives of medical students: a qualitative descriptive study.	8
Clinical exposure to peripheral nerve blocks in Canadian anesthesiology residency programs: a national survey of practice volumes and support for prioritizing core blocks in regional anesthesia residency education.	11
Mothers in anesthesia	15
Teaching and assessment strategies for acquiring competency in ultrasound-guided regional anesthesia: a survey of Canadian anesthesiology residency programs	18
The role of simulation-based team training in preparation for exit to airway for fetal neck mass	22

A scoping review on definitions and current applications of coaching in anesthesiology medical residency programs

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190

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INTRODUCTION

Anesthesia residency presents unique challenges that can be supported by coaching, including training in a dynamic and fast-paced setting, developing technical skills, and working in silo. Coaching reduces burnout, which affects 41% of residents, while fostering leadership, conflict resolution, and resilience^{1,2}. Interest in coaching within anesthesia education is growing; however, the term is often conflated with teaching and mentoring. True coaching is collaborative and performance-focused, involving observation, dialogue, and feedback, whereas teaching emphasizes knowledge transmission. When training strategies are misapplied as “coaching,” valuable learning opportunities are lost³. We aim to map the literature, clarify coaching definitions, and identify gaps.

METHODS

This scoping review follows the JBI methodology for scoping reviews. After a thorough literature search, we consulted a research librarian to develop our search strategy consisting of three concepts: “anesthesiology,” “coaching,” and “residents.” Searches were performed in MEDLINE, EMBASE, and Web of Science without language or date restrictions in May 2025. Articles were screened and extracted by two independent reviewers in Covidence and conflicts were resolved through discussion. Inclusion criteria were: participants who are medical residents, studies conducted in the context of anesthesiology, and interventions involving coaching. A manual search is currently being conducted to capture additional studies and expand our results. We will present a final analysis at the time of the conference. A preliminary descriptive summary was used to present the number of sources published each year, types of studies, study locations, terminologies used interchangeably with coaching, and gaps in the literature. Additionally, we conducted two separate directed content analyses to answer the subquestions: 1) How has coaching been defined in this context? and 2) How has coaching been applied in residency programs? This method includes coding the data, defining predetermined categories, organizing codes under the predetermined and new categories, and organizing the categories into themes.

RESULTS

Seven out of 505 screened abstracts were included, all from the USA. We captured two randomized controlled trials, one cross sectional study, two qualitative studies, one quality improvement study, and one observational study. Three of seven studies (43%) defined coaching, with key components included in all definitions being optimizing outcomes, observation of learner, and feedback. Some studies also highlighted prompting and troubleshooting as aspects of coaching. Three of seven studies (43%) used terms such as mentor, instructor, or teacher interchangeably with coaching. Our analysis of coaching identified two themes: coaching in-the-moment (CiM) and coaching over-time (CoT). CiM applications had a subtheme of real-time coaching and simulations, with tools including just-in-time task-trainers and mannequins for intubation and central venous catheters. CoT had a subtheme of longitudinal feedback meetings, including with the program director, chair, and faculty. Overall, coaching improved seven domains: clinical skills, confidence, professionalism, self-assessment, goal-setting, and resident wellness.

DISCUSSION

The core components identified across coaching definitions, namely observation, feedback, and performance improvement, align with existing coaching definitions. This study shows that residents prefer coaching over other educational interventions that lack true coaching elements, suggesting that well-structured coaching may be a more effective approach for resident development. We broadly identified coaching applications in anesthesia residency education as CiM and CoT, each with different scopes and benefits. Residency programs may consider formally implementing just-in-time training, mannequin simulations, and feedback meetings to enhance resident performance and wellbeing. Further research comparing faculty and peer coaching may highlight their value and feasibility.

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An expert-informed, pilot-tested bilingual survey to assess AI learning needs in Canadian anesthesiology training

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152

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INTRODUCTION

Generative and non-generative artificial intelligence (AI) tools increasingly support clinical care and research, yet postgraduate anesthesiology training has not kept pace with the competencies required for trainees to use AI safely and ethically in practice.^{1,2}

Anesthesiology offers a data-rich perioperative environment that can benefit from AI-enabled decision support and workflow optimization, but the degree to which anesthesiology trainees feel prepared to integrate these tools responsibly remains unclear.^{3,4}

Without evidence on learner needs, curriculum efforts risk fragmentation and inequity.⁵ We aimed to develop and validate a survey, co-designed with AI and anesthesiology experts and learners, to assess AI knowledge and perceived learning needs and inform Competency-Based Medical Education (CBME)-aligned curriculum design.

METHODS

We obtained Research Ethics Board approval. We informed item generation through a targeted literature search on domains required for safe and ethical AI use in anesthesiology research and clinical workflows. The research team drafted an initial item pool. We conducted a two-round Delphi process with 10 invited experts in anesthesia education and AI, selected for topic expertise and broad representation, of whom 7 participated. Experts voted anonymously over iterative rounds with controlled feedback, using an a priori consensus threshold of 70%. We pilot tested the English survey with 16 second-year medical students to assess usability and conceptual clarity. We summarized item clarity, content completeness, definition utility, survey length, section flow, and cognitive load using descriptive statistics. We produced English and French versions for electronic distribution

through postgraduate training programs to residents (PGY1 to 5) and fellows, with wider deployment planned for 2026.

RESULTS

Literature search and a two-round Delphi achieved 72% consensus, above the 70% threshold, and identified five domains: AI knowledge and technical literacy, attitudes and confidence, ethical and legal awareness, learning facilitators and barriers, and readiness for integration. The survey includes 24 items, uses 5-point Likert scales, and separates prompts into generative and non-generative categories. We analyzed all 16 pilot participants. Participants rated items as clear (88%) and domains as complete (81%). They rated the definition section and survey length as appropriate (81%). Section flow was rated good or excellent (81%), and 62% reported low or very low mental demand. Participants flagged redundancy in barrier items (31%), confusing terms such as “robotic” and “machine learning” (25%), and Likert scale anchors that did not align with whether the prompt assessed AI exposure or conceptual understanding. Participants reported a slightly positive to positive overall experience (88%), supporting minor revisions before deployment in 2026.

DISCUSSION

This pilot-validated survey provides an evidence-based tool to identify AI learning needs among anesthesiology trainees. By clarifying knowledge, attitudes, and readiness for integration, results can guide CBME aligned curriculum design and evaluation. Findings can inform faculty development and institutional policies addressing ethics, privacy, and bias, while keeping respondent burden low. These results will guide development of harmonized AI curricula, targeted faculty development strategies, and emerging national standards to ensure anesthesiologists are prepared to navigate AI-enabled practice environments and deliver high-quality patient care.

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Characteristics of good clinical teachers in anesthesiology and surgery from the perspectives of medical students: a qualitative descriptive study.

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71

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INTRODUCTION

Clinical teaching in medical education is integral to preparing future physicians. Previous studies have investigated the attributes of good clinical teachers(1), but these characteristics may not be universally applicable across medical specialties. In particular, anesthesiology and surgery may present unique challenges for clinical teachers due to the fast-paced, high-risk nature of the operating room, which necessitates a careful balance between patient safety and student learning. Some studies have independently assessed characteristics of good clinical teachers in anesthesiology(2) and surgery(3), but no work has compared these findings, particularly within the same cohort of medical learners. Our research aims to address this gap by describing what constitutes a good clinical teacher in anesthesiology and surgery from the perspectives of medical students at our university. In this way, our study may minimize heterogeneity related to learner characteristics and educational context, while ultimately contributing to the optimization of medical education and specialty-specific teaching strategies.

METHODS

We used the qualitative description approach, which stays close to the data to develop a rich description of the phenomenon(4).

Data Collection & Participants

This study was conducted at a medical school that uses a digital system to capture medical students' evaluations of their clinical teachers during each clerkship rotation. These evaluations include quantitatively-scaled items and an open-text field for written comments. We obtained the written comments from medical students who completed their mandatory anesthesia and surgery clerkship rotations in the 2023–2024 academic year. The evaluation system's administrative staff anonymized the data prior to analysis.

Data Analysis

We used the inductive qualitative content analysis method to analyze students' comments(5). This involved generating codes (keywords/phrases capturing one or two thoughts) describing what students perceived as positive teaching qualities or practices. Codes were grouped into categories, which were then synthesized into descriptive themes. A single analyst and group collaboration, as opposed to consensus, was used. During the data analysis process, our group met to discuss findings, define and redefine themes, and reflect about our impressions. We followed the principles of credibility, transferability, dependability, confirmability, and reflexivity to enhance trustworthiness(4), and the Consolidated Criteria for Reporting Qualitative Studies (COREQ) checklist to increase transparency.

RESULTS

In qualitative description, themes can be considered the final product of data analysis. We identified five themes for both anesthesiology and surgery: 1) "Teacher's individual characteristics" describes teachers' personality traits and professional values that enhance students' learning experience, such as kindness, patience, and empathy in clinical encounters; 2) "Characteristics that prioritize learner-centeredness" includes practices that recognize learners as individuals, such as tailoring teaching to learners' needs and building their confidence; 3) "Characteristics that optimize the learning/working environment" describes the qualities of an effective learning environment and practices that achieve this, such as framing mistakes as learning opportunities and maintaining healthy team dynamics; 4) "Characteristics that advance theoretical knowledge" identifies specific educational practices – including simple explanations, clinical case-based scenarios, and asking prompting questions – that contribute to learners' knowledge development; 5) "Characteristics that advance practical skills" identifies hands-on opportunities and elements of effective feedback that help students develop practical competencies.

DISCUSSION

Across both specialties, students valued teachers who tailored explanations and tasks to their experience levels, enabling deeper understanding and clinical engagement. A judgment-free environment was important, as it encouraged participation and learning from mistakes. Hands-on opportunities were valued, promoting skill development, self-esteem, and belonging. Specialty-specific differences also emerged: surgical teachers were valued for empathetic patient communication, reflecting longitudinal relationships, whereas anesthesia teachers were valued for prioritizing patient safety. As an admitting service with a high-volume of patient responsibilities, efficient task delegation was especially valued in surgery, as this preserved teaching time while allowing students to work in a well-coordinated team.

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Clinical exposure to peripheral nerve blocks in Canadian anesthesiology residency programs: a national survey of practice volumes and support for prioritizing core blocks in regional anesthesia residency education.

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INTRODUCTION

For anesthesiology residents, acquiring competency with peripheral nerve blocks (PNBs) is challenged by the proliferation of available techniques and the limitations to clinical exposure imposed by other learning needs. Currently, the Canadian Anesthesiology National Curriculum (CANC) lists 27 different PNB techniques for which residents are expected to demonstrate familiarity without any prioritization.¹ Prioritizing training towards a limited set of high-yield, *core PNBs* that are easy to perform and effective for common surgical procedures could facilitate acquiring competency during residency and retaining it in consultant practice.²

We surveyed Canadian anesthesiology residency programs to assess clinical exposure to the PNBs listed in the CANC and gauge support for defining specific core PNBs for prioritization during residency training. As hypothesized, we anticipated strong support for core PNB prioritization despite heterogeneity between programs in practice volumes and barriers to increasing clinical exposure. Our objective was to inform national and local curriculum renewal.

METHODS

A cross-sectional survey was developed, informed by a literature review focused on regional anesthesia education. The survey was revised based on multiple rounds of feedback from

content experts at 5 Canadian anesthesiology residency programs. After local institutional ethics board approval was obtained, online deployment occurred in May 2025. The survey was sent to a single respondent from each Canadian anesthesiology residency program who had previously been identified as the department member most familiar with the institution's regional anesthesia residency curriculum.

The survey content assessed the respondent's role, their program size, their relative priority of individual PNB techniques for residency training, and a typical resident's level of clinical exposure to individual PNB techniques at their institution. Clinical exposure was defined as performing a block with assistance or independently. Neuraxial techniques and Family Practice Anesthesiologist training were out of scope for this survey focused on PNBs and Royal College of Physicians and Surgeons of Canada anesthesiology residents.

Survey responses were analyzed descriptively. For questions related to core block prioritization, consensus was defined as greater than 75% of respondents agreeing or strongly agreeing with a statement. This percent agreement threshold is the median threshold used to define consensus agreement in Delphi consensus surveys.³

RESULTS

Respondents representing all 17 Canadian anesthesiology residency programs completed the survey questionnaire without any missing data. Eight respondents (47%) were residency program directors and 9 (53%) were regional anesthesia education leads for residents, fellows or both. The median number of PNBs expected to be performed during residency training was 150 (range 60 to 400), with no major differences noted between smaller and larger programs.

There was consensus (15 respondents, 88%) on prioritization of core PNBs, generally. Among the 27 PNBs listed in the CANC, 8 (30%) reached consensus for prioritization as core PNBs. Most programs expected each resident to perform each core PNB more than 10 times during training. All programs expected some exposure to each core PNB, except for the rectus sheath block, where 3 programs (18%) expected no exposure (Table). Insufficient expert consultants, high trainee numbers and limited case volumes were the most important barriers to clinical exposure.

DISCUSSION

Leadership at Canadian anesthesiology residency programs strongly supports prioritizing core PNBs during training. The 8 specific PNB techniques achieving consensus for prioritization closely match prior recommendations.² Implementation of this educational strategy would be facilitated by all core PNBs already having reliable clinical exposure in all programs, except for the rectus sheath block. Despite barriers to increasing clinical exposure, Canadian residents' overall volume of practice compares favorably with prior

reports⁴ and national curricula recommendations.^{1,5} These findings should be useful at the national and individual program level when planning curriculum renewal.

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Table. Expected anesthesiology resident clinical exposure* for 8 potential core peripheral nerve block techniques identified for prioritization during residency training.

Peripheral Nerve Block Technique	Number of residency programs where a resident would be expected to achieve the listed number of clinical exposures* over the course of residency			
	>10 clinical exposures	6 to 10 clinical exposures	1 to 5 clinical exposures	0 clinical exposures
Adductor canal (saphenous nerve)	17/17 (100%)	0/17 (0%)	0/17 (0%)	0/17 (0%)
Interscalene brachial plexus	15/17 (88%)	1/17 (6%)	1/17 (6%)	0/17 (0%)
Popliteal sciatic nerve	13/17 (76%)	3/17 (18%)	1/17 (6%)	0/17 (0%)
Transversus abdominis plane	9/17 (53%)	7/17 (41%)	1/17 (6%)	0/17 (0%)
Supraclavicular brachial plexus	9/17 (53%)	6/17 (35%)	2/17 (12%)	0/17 (0%)
Femoral nerve	9/17 (53%)	2/17 (12%)	6/17 (35%)	0/17 (0%)
Axillary brachial plexus	9/17 (53%)	2/17 (12%)	6/17 (35%)	0/17 (0%)
Rectus sheath	9/17 (53%)	2/17 (12%)	3/17 (18%)	3/17 (18%)

*Clinical exposure is defined as performing the peripheral nerve block either independently or with assistance.

Mothers in anesthesia

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74

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INTRODUCTION

Residency coincides with prime childbearing years, yet residents who are pregnant in residency or returning to work as new mothers often navigate fragmented information, variable institutional practices, and limited peer connection. Existing literature highlights how long hours and unpredictable demands intensify stress, guilt about burdening colleagues, and challenges with childcare and physically demanding rotations (Walsh et al., 2005; Sugimoto & Bayrampour, 2022). We propose a centralized, resident-facing resource hub that consolidates policies and practical guidance (leave, lactation, call/rotation adjustments, exposure mitigation, return-to-work planning). A core feature is opportunity for peer mentorship (resident-to-resident and staff-to-resident) using an anonymous matching algorithm based on shared lived experiences, aimed at fostering connection and normalization. Anticipated outcomes include improved preparedness, perceived support, and a more inclusive culture for anesthesiology trainees pursuing motherhood. To our knowledge, this is the first such initiative in the country, and our experience may offer a model for other residency programs.

METHODS

We used a design-based, mixed-methods approach to develop a resource hub for anesthesiology residents navigating pregnancy, parental leave, and return to training. First, a targeted literature review was conducted using MEDLINE, Embase, and grey literature to identify existing evidence on physician motherhood, resident wellness, parental leave policies, and physician peer mentorship. Key themes, barriers, and recommended supports were extracted and synthesized. Second, institutional, provincial, and national policies relevant to parental leave, accommodations, call scheduling, breastfeeding, and return to work were collated and translated into a visually accessible, user-centered format. Third, a confidential, web-based matching tool was developed to facilitate voluntary peer mentorship between attending physicians and residents at different stages of the motherhood journey. The tool collects minimal data, including topics of interest, and uses rule-based matching to pair mentors and mentees while preserving anonymity until matched. Iterative refinement of content and functionality was performed based on

feedback from a small group of resident stakeholders and faculty advisors. The final product integrates evidence-informed resources with resident-to-resident and staff-to-resident peer support.

RESULTS

The completed resource hub integrates four core components: (1) an evidence-informed summary of barriers and supports for resident physicians during pregnancy, parental leave, and return to work; (2) a centralized, accessible repository of institutional, provincial, and national policies; (3) collated recommendations for implementation at hospitals as workplaces, and (4) a secure, anonymous peer-mentorship matching tool. Policies were reorganized into plain-language material addressing common scenarios (e.g., call scheduling, leave planning, breastfeeding accommodations, and phased return). Stakeholder review by residents and faculty advisors confirmed clarity, relevance, and usability. The matching tool successfully paired participants based on areas of lived experience and preferred mentorship topics, while preserving anonymity until a match is made. The resource was disseminated to the anesthesiology residency cohort, as well as to select staff physicians with lived experiences. The hub is designed for iterative updates as policies change and new resources are identified.

DISCUSSION

This project demonstrates the feasibility of a centralized, user-centered resource combined with anonymously matched peer mentorship to address gaps in support for resident motherhood. Following dissemination within the residency program and among staff physicians with lived experiences, we expect to promote awareness, normalize discussions of pregnancy and parenthood in training, and facilitate timely access to accommodations. Future work will evaluate uptake and impact through usage analytics, surveys, and qualitative feedback, examining outcomes such as perceived support, ease of navigating policies, and mentorship satisfaction. These data will guide refinement and inform broader implementation across other training programs.

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Teaching and assessment strategies for acquiring competency in ultrasound-guided regional anesthesia: a survey of Canadian anesthesiology residency programs

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170

AUTHORS

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INTRODUCTION

A regional anesthesia curriculum for anesthesiology residents should facilitate the acquisition of the fundamental competencies required for ultrasound-guided regional anesthesia (UGRA) in preparation for consultant practice.¹ These competencies include not only foundational knowledge of anatomy, sonoanatomy and ultrasound physics but also technical skills of ultrasound operation, image capturing, and needle handling.²

In Canada, each anesthesiology residency program develops its own curriculum content, guided by expected learning outcomes outlined by a national accrediting body, the Royal College of Physicians and Surgeons of Canada (RCPSC).³ For formative and summative resident assessment, programs may use program-specific assessment tools to supplement the Entrustable Professional Activities (EPAs) published by the RCPSC.⁴

We surveyed Canadian anesthesiology residency programs on their UGRA education curriculum. As hypothesized, we anticipated heterogeneity in curricular content, educational strategies and approaches to assessment. Our aim was to identify opportunities for curriculum enrichment and collaboration between programs.

METHODS

A web-based, cross-sectional survey was approved by our local research ethics board after initial design and iterative refinement by experts in the Canadian regional anesthesia education community. The survey content drew upon a broad review of the regional

anesthesia education literature, including a recent international consensus curriculum.¹ Survey questions focused on UGRA teaching strategies and assessment methods for both foundational knowledge and technical skills. Our interest was primarily the strategies and methods used in nonclinical learning settings to prepare for and supplement clinical exposures and EPA evaluations. However, the survey questions also did include responses for teaching and assessment activities that occurred during clinical encounters. Family practice anesthesia resident training, and neuraxial anesthesia techniques were excluded in this survey focused on RCPSC specialist training and peripheral nerve block (PNB) techniques.

The survey was sent to one representative at each of the 17 Canadian anesthesiology residency programs in May 2025. The intended respondents were identified in advance of survey deployment as the person expected to be most familiar with the survey content for that program. They included residency program directors and regional anesthesia education leads for residency and fellowships. Responses were analyzed descriptively.

RESULTS

All 17 programs provided responses without any missing data. 13 programs (76%) offer at least two dedicated regional anesthesia rotations, with wide variability in the fraction of residents' total clinical PNB exposure that occurs on these rotations.

Programs use a range of teaching methods outside of clinical exposure to provide foundational knowledge and hands on experience (Table). About half of programs reported reliably scheduling these activities before dedicated regional anesthesia rotations.

For didactic knowledge evaluation, programs most frequently used EPA assessments (14 (82%)) and various forms of written tests (13 (77%)). Technical skill competency evaluation also relied heavily on EPA assessments (16 programs (94%)), with standardized assessment tools and simulators used infrequently (2 programs (12%)). Only 1 program (6%) required residents to demonstrate baseline pre-clinical knowledge or proficiency before advancing to clinical UGRA exposures. PNB logbooks were maintained at 8 (47%) programs but only 5 (29%) required minimum practice volumes.

DISCUSSION

There is variability across Canadian anesthesiology residency programs in the organization of dedicated regional anesthesia rotations, the use of pre-rotation training, the use of PNB logbooks and the teaching strategies employed for foundational and technical skill development. Yet, the frequently used electronic-based teaching strategies provide an opportunity for collaboration between programs.

Consistent with prior reports,⁵ we observed that active learning methods involving simulation were used less frequently than traditional didactic approaches, and that resident assessments rarely used validated tools or simulation-based evaluations for UGRA. These

findings represent opportunities for curriculum enrichment and expanding assessment opportunities beyond clinical settings.

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Table. Canadian anesthesiology residency programs' use of teaching strategies for ultrasound guided regional anesthesia training.

Teaching strategy	Number of programs
	N=17
Lectures or small group teaching	17/17 (100%)
Online videos (e.g. NYSORA videos)	16/17 (94%)
Ultrasound scanning workshops with live models	15/17 (88%)
Reference articles	13/17 (77%)
Low-fidelity simulation (e.g. use of gel phantoms, or animal tissue trainers)	10/17 (59%)
Quizzes or self-assessments	9/17 (53%)
Cadaveric lab workshops	7/17 (41%)
Online podcasts or educational audio	6/17 (35%)
Regional anesthesia courses on online LMS*(e.g. D2L Brightspace, Moodle, OpenX)	5/17 (29%)
Practice case workbooks	4/17 (24%)
High-fidelity simulators (e.g. use of sophisticated mannequins)	4/17 (24%)
Other	3/17 (18%)
Ultrasound scanning with live models without formal workshop	1/17 (6%)
One to one supervision	1/17 (6%)
Peer directed teaching/Medical Education rotations (R4 to R1)	1/17 (6%)

The role of simulation-based team training in preparation for exit to airway for fetal neck mass

Submission ID

115

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INTRODUCTION

EXIT (Ex-Utero Intrapartum Treatment) procedures are rare events, occurring approximately once per year at our institution. This complex procedure allows doctors to establish a secure airway in a newborn with critical airway obstruction while it remains connected to the maternal circulation. These cases involve a large interprofessional team, including pediatric and maternal specialists who would not normally work together, and include several critical steps to ensure the safety of mother and baby.

The role of interprofessional simulation in preparation for these events serves to harness learnings from human factors science and leverage the constraints of human cognition. (1) Rehearsing actions in the simulated environment ensures optimal flow of personnel, equipment, and information, and allows teams to anticipate problems and ensure mistake-proofing steps are in place.

CASE PRESENTATION

A 30-year-old G2P0 patient was found to have a fetus with a neck mass measuring 57x54x60mm at 32 weeks gestational age. An attempted EXIT to airway procedure was planned following multi-disciplinary discussion. A full-length simulation session was organized to optimize team performance prior to the date of delivery.

The simulation was led by the EXIT procedure coordinator – a physician not directly involved in the clinical care of the parturient or neonate. Each subspecialty wore color-coded clothing, and multiple maternal and neonatal scenarios were rehearsed. As a result of the simulation, communication flows were optimized, and critical touchpoints were identified. The full simulation was streamed live to a remote team, who reviewed and evaluated the interprofessional team in real time. A 'hot debrief' of the simulation provided an open forum for suggestions and feedback.

The EXIT to airway procedure was performed as planned at 36 weeks gestational age. An epidural and radial arterial line were sited prior to general anaesthesia with volatile (sevoflurane). A nitroglycerine infusion provided uterine relaxation, and hemodynamic stability was maintained with phenylephrine infusion. The neonatal airway was secured via video laryngoscopy with an oral endotracheal tube, and the time from uterine incision to delivery was 10 mins. Following delivery, maternal uterine tone was achieved with carbetocin and calcium chloride. Tranexamic acid was administered prophylactically. Quantitative blood loss was 1700ml, with 186ml returned from cell salvage. An excellent outcome was achieved for both the parturient and the neonate.

CONCLUSION

Simulation prior to complex interprofessional cases allows teams to attend to the human factors demands of rare events. A recent Cochrane review found that simulation-based team training in obstetric emergencies improves team performance and potentially reduces neonatal mortality. (2) In this case, simulation served to allow sharing of mental models, leading to increased team situational awareness, improved communication, and anticipation of errors. Continued education on human factors science and routinely scheduled interval team-based simulation may increase the probability of optimal performance in rare obstetric cases such as this.

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