International Journal of Anesthesia and Clinical Medicine
2025, Vol. 13, No. 1, pp. 46-57
https://doi.org/10.11648/j.ijacm.20251301.17

Case Report

Anesthetic Management of Extreme Obesity: A Case Study

Nicolas Mario Mas D Alessandro*, Elise Landsbergen, Vipul Dhumak

Department of Anesthesiology and Pain Management, The MetroHealth System, Case Western Reserve University School of Medicine, Cleveland, Ohio, US

Abstract

Obesity and Autism Spectrum Disorder (ASD) are prevalent conditions that significantly impact anesthetic management due to airway challenges, metabolic risks, and behavioral considerations. Obesity affects 42% of U.S. adults, while ASD prevalence in adults is approximately 2.21%, necessitating tailored perioperative care strategies. We describe the anesthetic management of a 30-year-old male with a BMI of 101.1, weighing 707 lb (320.7 kg), measuring 5'9" (1.75 m) and ASD undergoing dental surgery. Preoperative challenges included obesity-related airway risks and communication barriers due to ASD. Despite preoperative preparation, the patient was uncooperative, requiring anesthesia induction on a transport cart. General anesthesia was administered using a rapid-sequence intubation technique with succinylcholine, and airway management was facilitated with ramp positioning. Intraoperative care included sevoflurane, along with adjunctive infusions of propofol, dexmedetomidine, and boluses of fentanyl. Postoperative recovery was uneventful, with stable vitals and effective pain management. Patients with both obesity and ASD present unique anesthetic challenges, including increased airway management risks and behavioral sensitivities. Effective strategies include individualized preoperative preparation, the use of anxiolytics like midazolam, and vigilant intraoperative monitoring. Postoperative care requires careful pain assessment, as individuals with ASD may express discomfort atypically. This case highlights the importance of interdisciplinary collaboration and adherence to obesity-specific perioperative guidelines to optimize outcomes. Further research is needed to establish tailored guidelines for managing individuals with extreme obesity and ASD undergoing surgical procedures.

Keywords

Obesity, Morbid, Autism Spectrum Disorder, Airway Management, Perioperative Care

1. Introduction

Obesity and autism are two conditions that profoundly impact anesthetic decision-making, requiring individualized approaches to optimize patient safety and outcomes. Both conditions can complicate airway management and necessitate specialized perioperative strategies.

Obesity, affecting approximately 42% of U.S. adults, is a major public health challenge and is associated with an increased prevalence of type 2 diabetes, hypertension, cardiovascular disease, sleep disorders, osteoarthritis, and premature mortality–[1]. Similarly, autism spectrum disorder (ASD) poses unique challenges in perioperative care due to behavioral, sensory, and communication differences. Although robust surveillance systems are lacking, a 2017 study estimated that approximately 2.21% (95% simulation interval [SI] 1.95-2.45%) of U.S. adults aged 18-84 years have ASD, accounting for nearly 5.4 million individuals based on simula-

*Corresponding author: nmasdalessandro@metrohealth.org (Nicolas Mario Mas D Alessandro)

Received: 26 March 2025; **Accepted:** 16 April 2025; **Published:** 22 May 2025

Copyright: © The Author(s), 2025. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

tions and Bayesian hierarchical modeling [2].

This case study details the anesthetic management of a 30-year-old patient with a body mass index (BMI) of 101.7 and autism, undergoing a dental surgical procedure. Informed consent and permission to describe the case were obtained from the patient's legal guardian.

2. Anatomical and Physiological Changes in Obesity Leading to Difficult Airway Management

2.1. Upper Airway Obstruction

Fat deposition in the neck and pharyngeal regions is a major contributing factor to airway compromise in morbid obesity. The soft tissues around the airway, including the tongue, uvula, and pharyngeal walls, may increase the risk of airway obstruction during induction and emergence from anesthesia. This can lead to an increased incidence of obstructive sleep apnea (OSA), especially in patients with severe obesity [3, 4].

2.2. Increased Risk of Difficult Intubation

Morbidly obese patients often exhibit anatomical features that complicate airway management. These include:

1. Reduced Neck Mobility: Fat deposition around the cervical spine and larynx limits head extension and flexion, which are essential for proper visualization during intubation. Limited mobility of the neck may hinder the ability to achieve optimal intubating positions, complicating the laryngoscopic view.
2. Increased Soft Tissue Volume: Excess fat can lead to a narrow oropharyngeal space, making laryngoscopy and visualization of the vocal cords more difficult. The excess adipose tissue in the oropharyngeal region reduces space for the passage of the endotracheal tube, increasing the likelihood of difficult intubation [5, 6].
3. Increased Airway Collapsibility: The reduced tone in the upper airway muscles, combined with fatty tissue, contributes to increased airway collapsibility, especially under sedation or anesthesia. This increases the risk of airway obstruction, particularly in patients with central obesity.
4. Decreased Functional Residual Capacity (FRC): In morbid obesity, the increased abdominal fat reducing lung volumes, especially the functional residual capacity (FRC) [7]. This leads to rapid desaturation during apnea, making intubation more time sensitive. Additionally, the mechanical changes reduce tidal volume and expiratory reserve volume, which increase the likelihood of hypoventilation and atelectasis during anesthesia [8, 9].
5. Increased Risk of Aspiration: Obesity is associated with delayed gastric emptying and an increased risk of gastroesophageal reflux disease (GERD) [10, 11], both of which increase the risk of aspiration during anesthesia.

2.3. Respiratory Distress and Hypoventilation

Obese patients are prone to hypoventilation, both during induction and recovery. The increased adipose tissue around the chest wall and diaphragm results in impaired respiratory mechanics and reduced ventilatory drive. This is compounded by the potential for obesity hypoventilation syndrome (OHS), where hypoxemia and hypercapnia are exacerbated by obesity-related ventilatory restriction [12]. As a result, obese patients are at a higher risk for both intraoperative and postoperative respiratory complications, including hypoventilation and respiratory failure [13]. Additionally, excessive fat deposition around the chest wall decreases lung compliance, further limiting the ability to take deep breaths [8].

3. Preoperative Evaluation and Assessment for the Morbidly Obese Patient

The preoperative evaluation of a morbidly obese patient requires a comprehensive and multidisciplinary approach, focusing on addressing the specific medical, anesthetic, and surgical risks associated with obesity. Below is a structured approach to the preoperative assessment, including the necessary investigations and laboratory tests, with corresponding references.

3.1. Medical History and Comorbidities

The presence of obesity-related comorbidities is a crucial part of the preoperative assessment. Obese patients are more likely to have underlying conditions that can affect surgical outcomes.

1. Cardiovascular Disease: Common obesity-associated conditions include hypertension, coronary vascular disease, heart failure, and arrhythmias [14].
2. Metabolic syndrome and diabetes are prevalent, increasing the risks of perioperative complications [14].
3. Obstructive Sleep Apnea (OSA): OSA is highly prevalent in obese individuals, and undiagnosed cases can significantly affect anesthesia and postoperative recovery [3, 4].
4. Pulmonary Issues: Conditions such as obesity hypoventilation syndrome (OHS) or asthma may compromise respiratory function, increasing anesthetic risk [12, 15].
5. Gastroesophageal Reflux Disease (GERD): Obesity increases the likelihood of GERD, which can complicate anesthetic management due to increased aspiration risk [11].

Investigations:

1. The bibliography recommends the use of STOP BANG

questionnaire in order to screen OSA.

2. Cardiac Evaluation: ECG and echocardiogram are often indicated in patients with cardiovascular risk factors [16].

3.2. Physical Examination

A thorough physical examination is vital in identifying any potential risks that could affect the patient during surgery.

1. Airway Assessment: The Mallampati Classification is often used to predict airway difficulties, which are more common in obese patients due to excess soft tissue around the neck and throat [5, 6]. Neck circumference greater than 40 cm is a risk factor for difficult intubation [17].
2. Cardiovascular and Respiratory Exam: Obesity can increase the workload on the heart and lungs, leading to an increased risk of complications during anesthesia [7, 8, 14, 15]
3. Joint and Musculoskeletal Exam: Assess for reduced mobility or osteoarthritis, which could affect positioning during surgery [14, 18].

3.3. Laboratory Investigations

Routine and specific laboratory tests are critical in identifying any metabolic abnormalities or comorbid conditions that might complicate surgery.

a) Complete Blood Count (CBC): To detect anemia or signs of infection, which are common in obese patients [19, 20].

b) Electrolyte Panel: Electrolyte imbalances are common in obese patients due to medication use or comorbidities [21].

c) Renal Function Tests: Creatinine and BUN: Assess kidney function, as obesity can lead to chronic kidney disease [22].

d) Liver Function Tests (LFTs): To check for fatty liver disease or non-alcoholic steatohepatitis (NASH), which is common in obese patients [23].

e) Fasting Blood Glucose (FBG) and HbA1c: To assess for diabetes or poor glucose control in diabetic patients.

f) Thyroid Function Tests: Obesity is frequently associated with thyroid dysfunction, particularly hypothyroidism [24]. TSH, Free T4, Free T3.

g) Coagulation Profile: PT, aPTT, INR: To assess clotting function, especially for patients on anticoagulants or at risk of bleeding.

h) Arterial Blood Gas (ABG): An ABG can assess respiratory function in patients with OSA or obesity hypoventilation syndrome [13].

3.4. Cardiovascular and Pulmonary Assessment

Patients with obesity may have undiagnosed cardiovascular or pulmonary diseases that can complicate anesthesia and recovery.

a) Electrocardiogram (ECG): Routine for baseline evaluation, especially if the patient has risk factors for heart disease [16]

b) Chest X-Ray (CXR): Used to assess for pulmonary complications such as atelectasis or signs of heart failure.

c) Echocardiogram: Indicated for patients with known cardiovascular disease or those presenting with symptoms of cardiac failure.

d) Pulmonary Function Tests (PFTs): To assess the degree of respiratory compromise, particularly in patients with obesity hypoventilation syndrome or sleep apnea.

e) B-type Natriuretic Peptide (BNP): Elevated levels can indicate heart failure, which is common in obese individuals [25].

3.5. Nutritional and Metabolic Assessment

Despite excess weight, many morbidly obese patients suffer from malnutrition, which can affect wound healing and recovery [26].

a) Micronutrient Deficiencies: Obese patients may have deficiencies in vitamin D, B12, folate, iron, and other vitamins [26].

b) Nutritional Screening: Identifying deficiencies before surgery can optimize recovery and prevent postoperative complications [27].

c) Electrolyte Imbalances: Commonly seen in morbidly obese patients due to associated comorbidities or medications [21].

3.6. Risk Stratification and Perioperative Assessment

Risk stratification is essential to assess the likelihood of perioperative complications.

a) ASA Classification: Most morbidly obese patients are classified as ASA III or IV due to comorbid conditions [28].

b) Venous Thromboembolism (VTE) Risk: Obese patients are at an increased risk for VTE, requiring appropriate prophylaxis [29].

c) Preoperative Risk Assessment Tools: Tools like the Revised Cardiac Risk Index (RCRI) or National Surgical Quality Improvement Program (NSQIP) scoring systems can help guide perioperative decision-making [30].

3.7. Anesthesia Assessment

Obesity significantly complicates anesthesia management due to airway challenges and respiratory compromise.

Airway Evaluation: The Mallampati Score and neck circumference are crucial for predicting difficult intubation [6]. Video laryngoscopy and fiberoptic bronchoscopy are often recommended for difficult airways [6, 31]. In these patients, a difficult airway is anticipated, so it is important to have an airway management strategy.

a) A thorough preoperative airway assessment is crucial for identifying potential challenges in airway management and planning appropriate interventions. The following elements are key in assessing the airway in morbidly obese patients:

1. Mallampati Classification: The Mallampati score grades the visibility of the oropharyngeal structures and is a commonly used tool to predict difficult airway management. Although its accuracy is not absolute, a higher Mallampati score (III or IV) is often associated with difficulties in intubation, particularly in obese patients, due to the increased soft tissue in the airway [32].
2. Neck Circumference: A neck circumference greater than 40 cm is a significant predictor of difficult intubation and is associated with reduced laryngeal view and narrowed oropharyngeal space. In obese patients, the increased fat deposition around the neck leads to a higher likelihood of difficulty with intubation [17].
3. Thyromental Distance: A thyromental distance of less than 6 cm is associated with increased risk of difficult intubation, as it may indicate limited neck extension. In obese patients, the combination of increased fatty tissue and reduced neck mobility may make this measurement less reliable, but it remains an important part of the airway evaluation.
4. Inter-incisor Gap: A limited inter-incisor gap, the distance between the upper and lower incisors when the mouth is opened, can suggest difficulties with both mask ventilation and laryngoscopy. A restricted gap is common in morbidly obese patients due to increased tissue volume in the oral and oropharyngeal regions [33].
5. Physical Considerations: Obesity can impair the patient's ability to lie flat or undergo positioning changes, which is important for optimal intubation. Furthermore, associated conditions such as OSA or other comorbidities, which are prevalent in obese patients, should be considered, as they may complicate airway management [3, 4].

b) Anesthesia Plan: A rapid-sequence induction (RSI) is typically performed in morbidly obese patients to minimize aspiration risk. Anticipation of possible difficult intubation should guide preparation, including advanced airway management tools.

Capnography: For monitoring respiratory status during surgery and in recovery [34].

3.8. Incidence and Risk Factors

Obesity and autism spectrum disorder (ASD) each present unique challenges in perioperative care that can significantly impact anesthetic management and patient outcomes. In the United States, obesity affects approximately 42% of adults, and morbid obesity has been linked to a markedly increased risk of postoperative complications. For example, obese patients undergoing abdominal surgery may experience deep venous thrombosis (DVT) at rates as high as 48% compared to about 23% in non‐obese individuals [60]. Similarly, the risk for pulmonary embolism is substantially elevated in obese populations, and surgical site infections occur in roughly 2.4-4.5% of bariatric surgery patients [61]. Furthermore, obesity complicates airway management; some studies report that obese patients may experience up to a 20-fold increase in the incidence of difficult intubation and other life-threatening airway events [62].

In parallel, patients with ASD face additional perioperative challenges related to behavioral, sensory, and communication differences. Children with ASD are reported to be two to three times more likely to sustain injuries requiring medical attention compared with neurotypical children [63]. Moreover, pain expression in children with ASD may be atypical; standard pain assessment tools often underestimate their discomfort, which can lead to suboptimal pain management [64]. These findings underscore the necessity for individualized perioperative approaches that incorporate specialized risk assessment, tailored anesthetic dosing, environmental modifications, and effective communication strategies to optimize outcomes in both obese patients and those with ASD.

4. Strategies for Airway Management for Intubation in Morbid Obesity

Given the increased likelihood of difficult intubation and the potential for respiratory compromise, a series of strategies are necessary to ensure successful airway management in morbidly obese patients.

4.1. Preoperative Optimization

1. Continuous Positive Airway Pressure (CPAP): For patients with OSA, CPAP therapy should be continued preoperatively and possibly during anesthesia induction to maintain airway patency. CPAP has been shown to reduce airway collapse and improve oxygenation during the perioperative period [5, 35].
2. Preoxygenation: Extended preoxygenation is vital to increase oxygen reserves before induction. The use of-deep breaths or FiO2 can help increase oxygen saturation and prolong the safe apnea period during intubation [36].
3. Premedication: Premedication with sedatives or anxiolytics such as midazolam can help reduce anxiety and ease induction, especially in patients with behavioral comorbidities like autism spectrum disorder (ASD). However, caution must be exercised to avoid excessive sedation [37].

4.2. Positioning

a) Ramp Positioning: Elevating the head of the bed and positioning the patient's head, neck, and chest in alignment (the ramp position) can improve the alignment of the airway structures and facilitate laryngoscopy and intubation [38].
b) Use of Shoulder Roll: In conjunction with ramp positioning, shoulder rolls or pillows can help optimize airway alignment by increasing the extension of the neck, which can improve visualization of the glottis [6].

Ramped positioning during anesthesia induction has been shown to increase functional residual capacity (FRC) by enhancing diaphragmatic excursion and reducing abdominal pressure on the diaphragm. This positioning improves lung compliance and oxygenation, thereby reducing the risk of hypoxemia during intubation [39].

4.3. Induction and Intubation

a) Rapid-Sequence Induction (RSI): For obese patients, RSI is often preferred to prevent aspiration and reduce the risk of pulmonary complications [35]. This involves administering a sedative agent (e.g., propofol) and a paralytic (e.g., succinylcholine or rocuronium) in rapid succession, followed by immediate intubation.
b) Video Laryngoscopy: In morbidly obese patients, traditional direct laryngoscopy may be challenging due to the limited view of the glottis. Video laryngoscopy (e.g., Glidescope) has been shown to improve visualization and ease of intubation in patients with difficult airways, as it provides a real-time view of the airway [6, 31].
c) Alternative Devices: In cases of severe obesity or when video laryngoscopy fails, the use of an intubating laryngeal mask airway (ILMA) or fiberoptic intubation may be necessary to secure the airway. Studies have indicated that these devices are useful when conventional methods fail.

4.4. Ventilation Strategies

a) Positive Pressure Ventilation: Due to the risk of hypoventilation, morbidly obese patients often require mechanical ventilation with positive pressure to maintain adequate oxygenation and ventilation during surgery. End-tidal CO2 (EtCO2) monitoring is essential to assess the adequacy of ventilation [6, 36].
b) Oxygenation and Desaturation: Obese patients desaturate more quickly than their non-obese counterparts, necessitating prompt airway management and minimal apnea time during induction. SpO2 should be continuously monitored, and the patient's oxygen saturation should be optimized before and during the induction phase.

4.5. Emergence and Postoperative Care

a) Careful Emergence: Given the increased risk of airway collapse during emergence, it is important to maintain the patient's airway with adequate support (e.g., oral airway, nasal airway, or CPAP) until full consciousness is regained [5].
b) Postoperative Monitoring: Due to the risk of obesity hypoventilation syndrome (OHS) and postoperative respiratory failure, morbidly obese patients should be closely monitored in a post-anesthesia care unit (PACU) with continuous oxygenation and ventilation assessment. Additional supportive measures such as CPAP or bilevel positive airway pressure (BiPAP) may be required for patients with OSA or significant obesity-related respiratory compromise [5, 40]. If high-flow nasal cannula is available, it can also be helpful in the preoperative and postoperative periods.

5. Other Problems with Anesthesia During the Perioperative Period in Morbidly Obese Patients

5.1. Cardiovascular Complications

Morbid obesity is strongly associated with hypertension, diabetes mellitus, and cardiovascular disease (including heart failure, arrhythmias, and coronary artery disease), which complicate anesthetic management. The obesity-associated hyperdynamic circulation (increased cardiac output and blood volume) increases the risk of hypertensive crises, arrhythmias, and cardiac arrest during surgery [14]. Preoperative evaluation should include cardiac function assessment, such as, electrocardiogram (ECG), and echocardiography in patients with known cardiovascular risk factors [16].

5.2. Increased Risk of Venous Thromboembolism (VTE)

Obesity significantly increases the risk of venous thromboembolism (VTE), including deep vein thrombosis (DVT) and pulmonary embolism (PE) [29, 41]. Mechanical and pharmacologic thromboprophylaxis (e.g., heparin, low-molecular-weight heparin [LMWH]) should be used preoperatively, intraoperatively, and postoperatively, according to the patient, especially in long-duration surgeries. Early postoperative ambulation and the use of sequential compression devices (SCDs) can help mitigate this risk.

5.3. Altered Pharmacokinetics

Obesity alters the pharmacokinetics and pharmacodynamics of many anesthetic drugs. Increased body fat results in a larger volume of distribution for fat-soluble drugs, leading to prolonged drug effects and delayed clearance. Conversely, water-soluble drugs (e.g., muscle relaxants) may have a reduced volume of distribution in obese patients. Anesthesia providers must adjust drug dosages to lean body weight (LBW) to avoid overdose or inadequate effect, particularly with drugs such as propofol, fentanyl, muscle relaxants, and sedatives [42].

5.4. Opioid Sensitivity and Respiratory Depression

Obese patients are more sensitive to opioids, which increases the risk of respiratory depression and sedation [42]. A multimodal analgesia approach, incorporating non-opioid analgesics (e.g., acetaminophen, NSAIDs, regional blocks) is preferred to reduce opioid consumption and the associated risks. PCA (Patient-Controlled Analgesia) should be used cautiously, with close monitoring to prevent overdose, particularly in the postoperative period.

5.5. Delayed Emergence from Anesthesia

Due to increased adipose tissue, morbidly obese patients may experience delayed emergence from anesthesia due to prolonged drug action, particularly with long-acting anesthetics and opioids [43]. Close monitoring in the post-anesthesia care unit (PACU) is essential to detect delayed respiratory depression and to provide adequate airway support (e.g., oral or nasal airways, CPAP) (5,35,38).

5.6. Postoperative Nausea and Vomiting (PONV)

The occurrence of postoperative nausea and vomiting (PONV) is influenced by factors such as patient gender, surgical procedure, and overall health condition. PONV is more prevalent in obese patients and in cases where opioid or muscle relaxant antagonists were administered. Prompt use of antiemetic medications significantly reduces patient discomfort [44, 49].

5.7. Prolonged Hospital Stay and Complications

Obese patients may experience delayed wound healing, infection, and prolonged recovery, leading to longer hospital stays and a higher risk of complications [26]. Enhanced recovery protocols (e.g., early mobilization, nutrition support, wound care) should be employed to optimize recovery and reduce the risk of complications.

6. Case Presentation

6.1. Patient Information

A 30-year-old male, weighing 323 kg (714 lbs.), with a height of 175 cm (5’9”), a BMI of 101.7 kg/m^2, and a diagnosis of autism spectrum disorder (ASD) was scheduled for dental surgery. The patient also has a history of anxiety, panic attacks, intermittent explosive disorder, and attention-deficit hyperactivity disorder (ADHD), but no known comorbidities such as obstructive sleep apnea (OSA), diabetes, or hypertension. The patient was classified as ASA 4, indicating severe systemic disease. The legal guardian provided informed consent and the right to describe the case.

6.2. Procedure Indication

The patient underwent dental surgery, including multiple restorations, crowns, extractions, and alveoplasty due to extensive dental decay and other oral health issues.

6.3. Anesthetic Management

In the preoperative area, due to ASD, the patient exhibited anxiety and uncooperativeness. An intravenous line was placed using distractive methods, and 2 mg IV midazolam was given for premedication.

Upon arrival in the operating room, the patient did not cooperate to be moved onto the operative bed, despite prior discussions with the patient and guardian. It was decided to proceed with anesthesia induction in the transport cart, followed by surgery in the transport cart to avoid unnecessary injury due to the patient’s excessive weight. The transport cart was wider than the operating room bed and had a higher weight capacity. The patient was positioned in ramp position for optimal airway management, with padding using gel, blankets, and eggcrate foam to protect bony prominences.

General anesthesia was induced using a rapid-sequence approach with propofol (200 mg) and succinylcholine (100 mg). Nasal intubation was performed using a video laryngoscope due to anticipated difficulty with direct laryngoscopy. The use of shoulder rolls and head-up positioning to form a ramp facilitated optimal intubating conditions. The intubation was successful without complications. The patient was maintained on sevoflurane and propofol infusion, with additional medications including fentanyl boluses, a dexmedetomidine infusion (0.2 µg/kg/h), and rocuronium for muscle relaxation.

Lactated Ringer’s solution was used for fluid management. Intraoperative monitoring included non-invasive blood pressure, continuous pulse oximetry (SpO_2), ECG for heart rate and rhythm, and ventilation parameters. Core temperature was monitored to manage thermoregulation, and anesthetic depth was assessed using inhaled anesthetic levels.

6.4. Surgical Procedure

The patient underwent extensive dental procedures, including composite restorations on multiple teeth and extractions of multiple others. (The patient underwent extensive dental procedures, including composite restorations on teeth 6-F5, 7-F5, 10-F5, 11-F5, 22-F5, 27-F5, and stainless steel crowns on teeth 5-UR2, 13-UR3, 28-LR2, and 29-LR3. Tooth #21 underwent simple extraction, while surgical extractions and alveoplasty were performed on teeth #1, 3, 4, 12, 16, 17, 18, 19, 20, 31, and 32.

Two moistened throat packs were inserted during the procedure. The estimated blood loss was minimal, around 20 ml.

6.5. Postoperative Recovery

The patient was extubated without complications in the operating room and transferred to the post-anesthesia care unit (PACU) in stable condition. The patient was awake and stable, with no signs of postoperative nausea or vomiting. Vital signs post-anesthesia was as follows: blood pressure 149/81 mmHg, pulse 94 bpm, temperature 36.2 ℃ (97.1 ℉), respiratory rate 21 breaths/min, SpO_2 98%, and BMI 101.73 kg/m^2. Cardiopulmonary and respiratory statuses were stable throughout the recovery phase. Pain was well-managed, and recovery was uneventful.

7. Discussion

Childhood and adolescent obesity in the United States has reached alarming levels, with the prevalence more than doubling in children and tripling in adolescents over the past 30 years [45]. Obesity is a significant factor in the development of preventable diseases, including heart disease, stroke, type 2 diabetes (T2DM), and certain cancers. In individuals with autism spectrum disorder (ASD), the prevalence of obesity is even higher, with rates 69% greater than those in the general population [46]. Several factors contribute to this increased risk, including limited physical activity, restricted eating habits, and a preference for high-calorie, low-nutrient foods. Additionally, children with ASD often take medications, such as risperidone and aripiprazole, to manage disruptive behaviors, which can further increase the risk of weight gain [46].

Beyond obesity, children with ASD face other significant health challenges, such as an elevated risk of dental problems, oral microbiota imbalances, and traumatic injuries, all of which increase the likelihood of requiring Oro-maxillofacial surgeries. Furthermore, individuals with ASD are at a significantly higher risk of premature mortality due to a range of medical conditions, particularly among females with low-functioning ASD. Those with high-functioning ASD, on the other hand, face a heightened risk for suicide [47]. Additionally, traumatic experiences in childhood can lead to post-traumatic stress disorder (PTSD), a condition that may be more prevalent in children with autism, adding further complexity to their healthcare needs [48]. Several reviews emphasize the importance of individualized preoperative, perioperative, and postoperative care for obese and autistic patients undergoing surgery [37, 38].

Previous studies have demonstrated that obesity increases the risk of anesthetic complications, such as difficulties in airway management and the need for specialized intubation techniques, as well as hypoventilation during the postoperative period. The literature also suggests that ASD is associated with behavioral and communication challenges that can complicate surgical preparation [39]. During the preoperative period, healthcare providers must assess potential triggers for maladaptive behaviors and develop strategies for nonverbal communication. Many patients with ASD may struggle to interpret hand gestures, facial expressions, or tone of voice, all of which are often essential for understanding surgical procedures. For patients with limited verbal communication, visual aids or electronic devices can facilitate their ability to express themselves [51]. Additionally, scheduling surgeries early in the morning can help minimize wait times and fasting periods, which is particularly beneficial for these patients [50]. Midazolam is commonly used as a preoperative anesthetic, owing to its rapid onset, short duration, and minimal adverse effects.

Postoperatively, managing pain in patients with ASD presents unique challenges. Although it is a common misconception that individuals with autism have reduced pain sensitivity, recent studies indicate that they are just as responsive to painful stimuli but may express their discomfort in different ways [52, 53]. To detect subtle signs of pain, it is crucial to consult with the patient's parent or primary caregiver until the recovery process is complete. Obese patients also face increased risks for postoperative complications, including myocardial infarctions, wound infections, urinary tract infections, deep venous thrombosis (DVT), nerve injuries, and renal complications, with renal risks increasing up to sevenfold in patients with modified metabolic syndrome [41].

As discussed, managing patients with autism, obesity, anxiety, panic attacks, and the need for orofacial surgery under anesthesia requires a comprehensive approach that addresses both medical and behavioral needs to ensure safe and effective care. Preoperatively, the patient's behavior was assessed to allow them to familiarize themselves with the environment, and premedication with a benzodiazepine (midazolam 2 mg) was administered. The airway was carefully evaluated due to the increased risk of a difficult airway in these patients.

General anesthesia was chosen, with rapid-sequence intubation performed using succinylcholine. Anesthesia was maintained with sevoflurane and intermittent infusions of propofol, dexmedetomidine, and fentanyl boluses. Healthcare professionals must be prepared for potential difficult airway situations, as these can arise unexpectedly [54]. In this case, given the likelihood of a difficult intubation, all necessary precautions for airway management were undertaken, including positioning the patient in a ramped posture with interscapular elevation, which facilitated successful airway securing without significant complications.

The direct effects of fat deposition in the chest wall, abdomen, and upper airway can reduce lung volumes, particularly expiratory reserve volume, and cause structural changes that lead to altered mechanics and mild to moderate ventilation-perfusion (V/Q) mismatches [55]. These complications have been shown to be resolvable with bariatric surgery [9]. Additionally, adipose tissue is not only a storage site for fat but also an endocrine and paracrine organ that produces various cytokines and pro-inflammatory mediators, which are thought to contribute to the increased risk of conditions like asthma in obese individuals [56]. In this case, the patient was scheduled for orofacial surgery, which increased the risk of airway irritation due to secretions. By securing the airway, we mitigated these risks. Though various clinical and surgical options for managing the patient's obesity were discussed, they fall beyond the scope of this case report.

Patients with modified metabolic syndrome—characterized by obesity, hypertension, and diabetes—are at significantly higher risk for complications during noncardiac surgery compared to those with a normal weight, or even those who are overweight but without metabolic syndrome. Therefore, perioperative guidelines tailored to obese patients should be followed, with careful consideration given to other health factors and comorbidities in this population [46, 57]. Excess weight, defined as above the healthy range for a specific height, is categorized as overweight or obese, with body mass index (BMI) commonly used as a screening tool to identify overweight and obesity [58]. While several classification systems exist for obesity, none appear to fully accommodate the specific needs of patients like the one in this case.

While higher levels of obesity are often associated with increased risk and higher mortality rates, recent studies suggest that severe obesity may not be directly linked to higher mortality but is associated with longer hospital stays, a greater likelihood of kidney failure, and increased need for prolonged ventilation [59]. This has been particularly observed in cardiovascular surgery patients with a BMI over 40. However, there is limited research focusing on individuals with autism and a BMI 30 points higher than those typically studied, underscoring a gap in the literature and highlighting the need for further exploration of this specific patient population in the context of orofacial surgery for obese autistic patients.

8. Conclusions

This case demonstrates the successful anesthetic management of an obese patient with Autism Spectrum Disorder (ASD), emphasizing the importance of a comprehensive and individualized approach. Key considerations include early preoperative assessment, tailored anesthetic techniques, and vigilant monitoring throughout the perioperative period. This approach minimizes the risks associated with both obesity and ASD, optimizing the safety and efficacy of the surgical procedure.

Abbreviations

ASA	American Society of Anesthesiologists
BNP	B- type Natriuretic Peptide
CBC	Complete Blood Count
CXR	Chest X- Ray
ECG	Electrocardiogram
FBG	Fasting Blood Glucose
LFTs	Liver Function Tests
OHS	Obesity Hypoventilation Syndrome
OSA	Obstructive Sleep Apnea
PFTs	Pulmonary Function Tests
RCRI	Revised Cardiac Risk Index
TSH	Thyroid Stimulating Hormone
VTE	Venous Thromboembolism
HbA1c	Hemoglobin A1c
BMI	Body Mass Index
NSQIP	National Surgical Quality Improvement Program
Thyromental Distance	Measurement Used in Airway Evaluation
Inter	Incisor Gap-Measurement to Assess Difficulties in Mask Ventilation and Laryngoscopy
Mallampati Score	Tool to Predict Difficult Intubation Based on Visibility of Oropharyngeal Structures
RSI	Rapid- Sequence Induction
CPAP	Continuous Positive Airway Pressure
ILMA	Intubating Laryngeal Mask Airway
EtCO2	End- tidal CO2
PACU	Post- Anesthesia Care Unit
PONV	Postoperative Nausea and Vomiting
PCA	Controlled Analgesia
ASD	Atrial Septal Defect

Acknowledgments

This section serves to recognize contributions that do not meet authorship criteria, including technical assistance, donations, or organizational aid. Individuals or organizations should be acknowledged with their full names. The acknowledgments should be placed after the conclusion and before the references section in the manuscript.

Author Contributions

Nicolas Mario Mas D Alessandro: Conceptualization, Investigation, Writing - original draft, Writing - review & editing

Elise Landsbergen: Data curation, Methodology, Formal Analysis, Writing - review & editing

Vipul Dhumak: Resources, Supervision, Validation, Project administration, Writing - review & editing

Funding

This project was supported in part by the Clinical and Translational Science Collaborative (CTSC) of Cleveland which is funded by the National Institutes of Health (NIH), National Center for Advancing Translational Science (NCATS), Clinical and Translational Science Award (CTSA) grant, UL1TR002548. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Data Availability Statement

Not applicable.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Elmaleh-Sachs A, Schwartz JL, Bramante CT, Nicklas JM, Gudzune KA, Jay M. Obesity Management in Adults. JAMA. 2023 Nov 28; 330(20): 2000.

[2] Dietz PM, Rose CE, McArthur D, Maenner M. National and State Estimates of Adults with Autism Spectrum Disorder. J Autism Dev Disord. 2020 Dec 10; 50(12): 4258-66. https://doi.org/10.1007/s10803-020-04494-4

[3] Cielo CM, Keenan BT, Wiemken A, et al. Neck fat and obstructive sleep apnea in obese adolescents. Sleep. 2021 Jun 24; 44(11): zsab158. https://doi.org/10.1093/sleep/zsab158

[4] Eldaabousy SA, Awad A, Abo-AL Hassan S, Nour MO. Neck circumference as a predictor for the presence and the severity of obstructive sleep apnea in snoring patients. *IP Indian Journal of Immunology and Respiratory Medicine*. 2021; 6(2): 98-104. https://doi.org/10.18231/j.ijirm.2021.022

[5] Thota B, Jan KM, Oh MW, Moon TS. Airway management in patients with obesity. *Saudi Journal of Anaesthesia*. 2022; 16(1): 76-81. https://doi.org/10.4103/sja.sja_351_21

[6] Liew WJ, Negar A, Singh PA. Airway management in patients suffering from morbid obesity. Saudi J Anaesth. 2022; 16(3): 314-21. https://doi.org/10.4103/sja.sja_90_22

[7] Lachmann B, van Lith J, Plotz FB, et al. "Lung volumes, respiratory mechanics and dynamic strain during general anaesthesia." *British Journal of Anaesthesia*. 2018; 121(5): 1126-1135. https://doi.org/10.1016/j.bja.2018.06.013

[8] Sudy R, Peták F, Kiss L, et al. Obesity and diabetes: similar respiratory mechanical but different gas exchange defects. *American Journal of Physiology-Lung Cellular and Molecular Physiology*. 2021; 320(5): L757-L767. https://doi.org/10.1152/ajplung.00439.2020

[9] Rivas E, Arismendi E, Agustí A, Sanchez M, Delgado S, Gistau C, et al. Ventilation/Perfusion Distribution Abnormalities In Morbidly Obese Subjects Before and After Bariatric Surgery. Chest. 2015 Apr; 147(4): 1127-34. https://doi.org/10.1378/chest.14-1749

[10] Acosta A, Camilleri M, Shin A, et al. "Quantitative gastrointestinal and psychological traits associated with obesity and response to weight-loss therapy." *Gastroenterology*. 2015; 148(3): 537-546.e4. https://doi.org/10.1053/j.gastro.2014.11.020

[11] Tolone S, Savarino EV, De Bortoli N, et al. "Esophageal high-resolution manometry and 24 h pH-impedance monitoring normative values in patients with obesity candidate for bariatric and metabolic surgery." *Updates in Surgery*. 2025; 77(1): 275-285. https://doi.org/10.1007/s13304-025-02167-4

[12] Shetty S, Parthasarathy S. Obesity hypoventilation syndrome. Curr Pulmonol Rep. 2015 Mar 1; 4(1): 42-55. https://doi.org/10.1007/s13665-015-0108-6

[13] Eva S. Screening and Perioperative Management of Obesity Hypoventilation Syndrome. J Clin Respir Dis Care. 2024; 10: 318. https://doi.org/10.3390/jcm13175000

[14] O'Neill S, O'Driscoll L. "Obesity and risk of cardiovascular disease: recent advances and future directions." *Current Diabetes Reviews*. 2015; 11(2): 108-115. https://doi.org/10.2174/1573399811666150424121920

[15] Zhao Y, Zhang Y, Li J, et al. "Association between abdominal obesity and asthma: a meta-analysis." *BMC Pulmonary Medicine*. 2019; 19(1): 63. https://doi.org/10.1186/s12890-019-0333-6

[16] American College of Cardiology. (2024). 2024 Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery. Retrieved from https://professional.heart.org/en/science-news/2024-guideline-for-perioperative-cardiovascular-management-for-noncardiac-surgery

[17] Chung F, Abdullah HR, Liao P. STOP-Bang Questionnaire. Chest. 2016 Mar; 149(3): 631-8. https://doi.org/10.1378/chest.15-0903

[18] Stephenson J, Smith CM, Kearns B, Haywood A, Bissell P. "The association between obesity and quality of life: a retrospective analysis of a large-scale population-based cohort study." *BMC Public Health*. 2021; 21(1): 1990. https://doi.org/10.1186/s12889-021-12009-8

[19] Alshwaiyat NM, Ahmad A, Wan Hassan WMR, Al-Jamal HAN. Association between obesity and iron deficiency (Review). Exp Ther Med. 2021 Nov; 22(5): 1268. https://doi.org/10.3892/etm.2021.10703

[20] Dörner J, Kienbacher C, et al. "Obesity and infectious diseases: pathophysiology and epidemiology of a complex relationship." *European Journal of Clinical Nutrition*. 2021; 75(1): 1-9. https://doi.org/10.1038/s41430-020-00769-1

[21] Crintea IN, Cindrea AC, Mederle OA, Fulga TF, Marza AM, Petrica A, et al. Obesity as a Risk Factor for Hyperglycemia, Electrolyte Disturbances, and Acute Kidney Injury in the Emergency Department. Biomedicines. 2025 Feb 3; 13(2): 349. https://doi.org/10.3390/biomedicines13020349

[22] Nawaz S, Chinnadurai R, Al‐Chalabi S, Evans P, Kalra PA, Syed AA, et al. Obesity and chronic kidney disease: A current review. Obes Sci Pract. 2023 Apr 19; 9(2): 61-74. https://doi.org/10.1002/osp4.629

[23] Sarwar R, Pierce N, Koppe S. Obesity and nonalcoholic fatty liver disease: current perspectives. Diabetes Metab Syndr Obes. 2018 Sep; Volume 11: 533-42. https://doi.org/10.2147/DMSO.S146339

[24] Song RH, Wang B, Yao QM, Li Q, Jia X, Zhang JA. The Impact of Obesity on Thyroid Autoimmunity and Dysfunction: A Systematic Review and Meta-Analysis. Front Immunol. 2019; 10: 2349. https://doi.org/10.3389/fimmu.2019.02349

[25] Shen Q, Hiebert JB, Rahman FK, Krueger KJ, Gupta B, Pierce JD. Understanding Obesity-Related High Output Heart Failure and Its Implications. International journal of heart failure. 2021 Jul; 3(3): 160-71. https://doi.org/10.36628/ijhf.2020.0047

[26] Kobylińska M, Antosik K, Decyk A, Kurowska K. Malnutrition in Obesity: Is It Possible? Obes Facts. 2022; 15(1): 19-25. https://doi.org/10.1159/000519503

[27] National Guideline Centre (UK). Evidence review for nutritional screening in preoperative assessment. NICE Guideline. 2020; 180. PMID: 32931171 Bookshelf ID: NBK561979

[28] Doyle DJ, Hendrix JM, Garmon EH. StatPearls. 2023. American Society of Anesthesiologists Classification. https://doi.org/10.1186/s12893-021-01256-6

[29] Hotoleanu C. Association between obesity and venous thromboembolism. Med Pharm Rep. 2020 Apr; 93(2): 162-8. https://doi.org/10.15386/mpr-1372

[30] Mahmood SR, Lobo SA, Fischer S. Cardiac Risk Assesment. StatPearls. 2023. PMID: 30725831 Bookshelf ID: NBK537146.

[31] Sato T, et al. "Efficiency of laryngeal mask airway ProtectorTM and i-gel® as a conduit for Aintree catheter-guided fibreoptic tracheal intubation." *Anaesthesia, Pain & Intensive Care*. 2022; 26(3): 295-300. https://doi.org/10.5114/ait.2022.115366.

[32] Hanouz JL, Lefrançois V, Boutros M, Fiant AL, Simonet T, Buléon C. "Comparison of the modified Mallampati classification score versus the best visible Mallampati score in the prediction of difficult tracheal intubation: a single-centre prospective observational study." *Can J Anaesth*. 2024 Aug; 71(8): 1353-1362. https://doi.org/10.1007/s12630-024-02815-0

[33] Pouzoulet J, Maillard D, Harnois F, Msika S, Coffin B. "Challenges in Ventilation in Patients with Obesity." *Obesity Surgery*. 2024 Feb; 34(2): 456-463. https://doi.org/10.1007/s11695-023-06454-2

[34] Prathanvanich P, Chand B. The role of capnography during upper endoscopy in morbidly obese patients: a prospective study. Surg Obes Relat Dis. 2015; 11(1): 193-8. https://doi.org/10.1016/j.soard.2014.05.018

[35] Bussières, J.S., Couture, E.J., Provencher, S., Tanoubi, I., Marceau, S., & Bussières, F. (2023). Effect of reverse Trendelenburg position and positive pressure ventilation on safe non-hypoxic apnea period in obese: a randomized-control trial. *BMC Anesthesiology*, 23(1), 198. https://doi.org/10.1186/s12871-023-02128-7

[36] Ortiz VE, Vidal-Melo MF, Walsh JL. Strategies for managing oxygenation in obese patients undergoing laparoscopic surgery. Surg Obes Relat Dis. 2015; 11(3): 721-8. https://doi.org/10.1016/j.soard.2014.11.021

[37] Selvey P, Stypulkowski K, Waisbren S. Surgical management of the patient living with autism. Surg Open Sci. 2019 Oct; 1(2): 90-6. https://doi.org/10.1016/j.sopen.2019.06.006

[38] Seyni-Boureima R, Zhang Z, Antoine MMLK, Antoine-Frank CD. A review on the anesthetic management of obese patients undergoing surgery. BMC Anesthesiol. 2022 Apr 5; 22(1): 98. https://doi.org/10.1186/s12871-022-01579-8

[39] Tsan SEH, Ng KT, Lau J, Viknaswaran NL, Wang CY. [A comparison of ramping position and sniffing position during endotracheal intubation: a systematic review and meta-analysis]. Braz J Anesthesiol. 2020; 70(6): 667-77. https://doi.org/10.1016/j.bjan.2020.08.009

[40] Harsha P, Paul JE, Chong MA, et al. "Challenges With Continuous Pulse Oximetry Monitoring and Wireless Clinician Notification Systems After Surgery: Reactive Analysis of a Randomized Controlled Trial." *JMIR Med Inform*. 2019 Oct; 7(4): e14603. https://doi.org/10.2196/14603

[41] Zhao, D., Li, J., Li, Z., Li, Y., & Li, J. (2023). "Modified Metabolic Syndrome Predicts Worse Outcomes in Obese Patients Undergoing Noncardiac Surgery." *Obesity Surgery*, 33(1), 123-130. https://doi.org/10.1016/j.soard.2023.01.027

[42] Pandit JJ, Cook TM. "Estimating the induction dose of propofol in morbid obesity: striking a balance between lean and total body weight." Br J Anaesth. 2017 May; 118(5): 700-703. https://doi.org/10.1093/bja/aex054

[43] Cascella M, Bimonte S, Di Napoli R. Delayed Emergence from Anesthesia: What We Know and How We Act. Local Reg Anesth. 2020 Nov; Volume 13: 195-206. https://doi.org/10.2147/LRA.S230728

[44] Amirshahi M, Behnamfar N, Badakhsh M, Rafiemanesh H, Rezaie Keikhaie K, Sheyback M, Sari M. "Prevalence of postoperative nausea and vomiting: A systematic review and meta-analysis." *Saudi J Anaesth*. 2020 Jan; 14(1): 48-56. https://doi.org/10.4103/sja.SJA_401_19

[45] Sanyaolu A, Okorie C, Qi X, Locke J, Rehman S. Childhood and Adolescent Obesity in the United States: A Public Health Concern. Glob Pediatr Health. 2019 Jan 1; 6. https://doi.org/10.1177/2333794X19891305

[46] Criado KK, Sharp WG, McCracken CE, De Vinck-Baroody O, Dong L, Aman MG, et al. Overweight and obese status in children with autism spectrum disorder and disruptive behavior. Autism. 2018 May 22; 22(4): 450-9. https://doi.org/10.1177/1362361316683888

[47] Hirvikoski T, Mittendorfer-Rutz E, Boman M, Larsson H, Lichtenstein P, Bölte S. Premature mortality in autism spectrum disorder. British Journal of Psychiatry. 2016 Mar 2; 208(3): 232-8. https://doi.org/10.1192/bjp.bp.114.160192

[48] Doherty M, Neilson S, O'Sullivan J, Carravallah L, Johnson M, Cullen W, et al. Barriers to healthcare and self-reported adverse outcomes for autistic adults: a cross-sectional study. BMJ Open. 2022 Feb 22; 12(2): e056904. https://doi.org/10.1136/bmjopen-2021-056904

[49] Amirshahi M, Behnamfar N, Badakhsh M, Rafiemanesh H, Rezaie Keikhaie K, Sheyback M, Sari M. "Prevalence of postoperative nausea and vomiting: A systematic review and meta-analysis." *Saudi J Anaesth*. 2020 Jan; 14(1): 48-56. https://doi.org/10.4103/sja.SJA_401_19

[50] Lewis I, Burke C, Voepel-Lewis T, Tait AR. "Anaesthesia for the uncooperative child." *Continuing Education in Anaesthesia, Critical Care & Pain*. 2017 Nov; 17(6): 230-234. https://doi.org/10.1093/bjaed/mkx030

[51] Khatavkar SS, Deshpande TP, Zayed S, Misal MZ, Kate P. "Comparison of oral Midazolam with Ketamine versus oral Midazolam as a premedication in children." *Indian Journal of Pain*. 2020; 34(1): 22-27. https://doi.org/10.4103/ijpn.ijpn_38_19

[52] Kouo, J.L., & Kouo, T.S. "Optimizing Care for Autistic Patients in Health Care Settings." *Academic Pediatrics*, 2023. https://doi.org/10.1016/j.acap.2023.02.001

[53] McMurtry, C. M., & Chambers, C. T. "Everyday expressions of pain in children with and without autism: The pain faces of children." *European Journal of Pain*, 2016; 20(2): 88-97. https://doi.org/10.1097/00002508-200403000-00005

[54] Jung H. A comprehensive review of difficult airway management strategies for patient safety. Anesth Pain Med (Seoul). 2023 Oct 31; 18(4): 331-9. https://doi.org/10.17085/apm.23123

[55] Brazzale DJ, Pretto JJ, Schachter LM. Optimizing respiratory function assessments to elucidate the impact of obesity on respiratory health. Respirology. 2015 Jul; 20(5): 715-21. https://doi.org/10.1111/resp.12563

[56] Nightingale CE, Margarson MP, Shearer E, Redman JW, Lucas DN, Cousins JM, et al. Peri-operative management of the obese surgical patient 2015. Anaesthesia. 2015 Jul; 70(7): 859-76. https://doi.org/10.1111/anae.13101

[57] Lin X, Li H. Obesity: Epidemiology, Pathophysiology, and Therapeutics. Front Endocrinol (Lausanne). 2021 Sep 6; 12. https://doi.org/10.3389/fendo.2021.706978

[58] Srinivasan, A., & Hannan, E. L. "Body Mass Index and Mortality Among Adults Undergoing Cardiac Surgery." *Circulation*. 2017; 135(9): 850-860.

[59] Mariscalco, G., Wozniak, M., Dawson, A. G., Serraino, G., & Porter, R. "Body Mass Index and Mortality Among Adults Undergoing Cardiac Surgery: A Nationwide Study With a Systematic Review and Meta-Analysis." *Circulation*. 2017 Feb 28; 135(9): 850-860. https://doi.org/10.1161/CIRCULATIONAHA.116.022840

[60] AbuRahma AF, et al. *Deep venous thrombosis in obese patients undergoing abdominal surgery.* J Vasc Surg. 2018; 68(2): 457-463. https://doi.org/10.1016/j.jvs.2018.07.002

[61] Anderson DJ, Podgorny K, Berríos-Torres SI, et al. *Strategies to prevent surgical site infections in acute care hospitals: 2014 update.* Infect Control Hosp Epidemiol. 2014; 35(6): 605-627. https://doi.org/10.1086/677883

[62] Cook TM, Woodall N, Frerk C. *Major complications of airway management in the United Kingdom: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society.* Anaesthesia. 2015; 70(6): 707-721. https://doi.org/10.1111/anae.13418

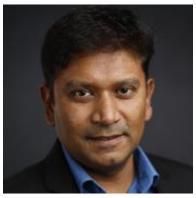
[63] Muskat B, Riosa PB, Nicholas DB, et al. *Autism comes to the hospital: The experiences of patients with autism spectrum disorder, their parents, and health‐care providers at two Canadian paediatric hospitals.* Acad Pediatr. 2023; 23(3): e136-e142. https://doi.org/10.1016/j.acap.2023.02.001

[64] Knoll AKI, McMurtry CM, Chambers CT. *Pain in children with autism spectrum disorder: Experience, expression, and assessment.* Pediatr Anesth. 2016; 26(1): 1-8. https://doi.org/10.1111/pan.12218

Biography

Nicolás Mario Mas D Alessandro, MD Physician anesthesiologist with background in anesthesiology and clinical research. Completed medical education at Favaloro University (2012-2017) and residency in Anesthesiology at the University of Buenos Aires (2018-2023). Board-certified in Argentina, currently pursuing board certification in the United States. Engaged in research focused on quality improvements in anesthesiology, pain management and the development of educational programs for residents. Actively involved in publishing and presenting research, with a commitment to patient-centered care and serving underserved populations.

Elise Landsbergen, BS, MPH Elise Landsbergen holds a B.S. in biology from Denison University and a Master's of Public Health from The University of Pennsylvania. Elise currently works as a Clinical Research Coordinator in the Department of Anesthesiology and Pain Management at MetroHealth in Cleveland, OH.



Vipul Dhumak, Pediatric Anesthesiologist and Division Director of Pediatric Anesthesiology at MetroHealth Medical Center, Cleveland, Ohio. Assistant Professor at Case Western Reserve University, Cleveland, Ohio. Dr. Dhumak completed his medical school at Terna Medical College in Mumbai, India, followed by Residency in Anesthesia at Grant Medical College. He completed his Residency in Anesthesiology and Fellowship in Pediatric Anesthesiology at the Cleveland Clinic in 2015 and is board-certified by the American Board of Anesthesiology in both Anesthesiology and Pediatric Anesthesiology. Since then, he has worked as a Pediatric Anesthesiologist at the University of Iowa Children's Hospital and West Virginia University Children's Hospital. Dr. Dhumak is actively involved in research and teaching, with a strong commitment to advancing the field of anesthesiology.

Research Field

Nicolas Mario Mas D Alessandro: anesthesiology, pain management, perioperative care, patient safety, quality improvement, ambulatory surgery, clinical research, medical education, surgical outcomes.

Elise Landsbergen: anesthesiology, pain management, anesthesia management, patient safety, medical education, surgical outcomes, chronic pain management, healthcare quality improvement, clinical guidelines.

Vipul Dhumak: anesthetic techniques, airway management, sedation protocols, pediatric anesthesia, medical education, patient monitoring, perioperative medicine, evidence-based practice, healthcare quality improvement, clinical guidelines.