The Role of Hospital-Based Dentistry in Providing Treatment for Persons with Developmental Delay

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ABSTRACT

Hospital dentistry is important to the delivery of oral health care to persons with disabilities. Recent cuts in funding for hospital dentistry in Ontario have placed a great strain on the health care system's ability to meet the demand for such care. General anesthesia is an accepted treatment option for patients who are uncooperative, but involves inherent risks. In this paper, we present the case of a person with developmental delay who received dental treatment under general anesthesia and subsequently developed complications to support the position that a dental program for persons with special needs should be provided in a hospital setting to minimize their risk of suffering serious complications and to ensure their safety.

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Hospital-based dentistry plays an important role in the delivery of oral health care to patients with special needs who are unable to receive their required dental care in their community. Oral health care is considered a vital component of overall health care, but the health care system's ability to provide this necessary care is compromised.[1–4] The Canadian health care system and hospitals have undergone significant restructuring in the past decade in response to an ever-increasing demand for service. Also, a longstanding history of operating in a fiscal environment of reduced funding with rising costs has resulted in significant deficits.[5] Hospital-based dentistry in Ontario has felt the effect of these changes because of a reduction in available operating room time and resources dedicated to dentistry. In some cases, these reductions have resulted in the elimination of hospital clinical programs.[5] In Toronto, the dental departments in 3 fully affiliated teaching hospitals of the University of Toronto were closed during this period. The closures resulted in a reduction in the number of one-year hospital dental residency positions offered by Toronto's faculty of dentistry from 32 to the current 13, and also resulted in the relocation of the graduate program in oral and maxillofacial surgery.[5]

Persons with disabilities or special health care needs can be and are treated in community practice settings. However, many must be seen in a hospital setting because of their need for care in an operating room under general anesthesia or because of the complex nature of their medical condition.[6] The Hospital for Sick Children in Toronto provides oral health care for children with disabilities or who are medically compromised until the age of 18 years; after that they must seek continued care in their community. Toronto's Mount Sinai Hospital's dental program for persons with disabilities was established in

the early 1970s to provide oral health care for persons who required continued care in a hospital setting. These patients are seen only by referral from their primary care physician, dentist, dental clinic, case support worker or allied institution. The Mount Sinai Hospital program is the largest program of its type in Canada, with the dedicated staff and resources needed to provide care for these persons, regardless of the severity of their disability.[7] The current waiting list for an initial nonurgent consultation is from 3 to 6 months, and the waiting period for dental care under general anesthesia is 9 months to a year after the initial consultation.

The following case is presented to support the position that a dental program for persons with special needs should be provided in a hospital setting to minimize their risk of suffering serious complications and to ensure their safety.

Case Report

A 28-year-old nonverbal healthy man with a severe developmental delay was scheduled for dental treatment under general anesthesia because of his inability to cooperate with dental care done in an ambulatory clinic. His only daily medication was 25 mg quetiapine fumarate, prescribed to modify his behaviour. According to hospital policy, his family physician did the preoperative medical assessment. The patient had previously been treated under general anesthesia to repair a left inguinal hernia and on 3 different occasions for comprehensive dental treatment without any significant complications. He was assessed by the anesthetist immediately before entering the operating room, who reaffirmed that the patient was fit for general anesthesia, as planned. In addition, his family, with whom he resided, confirmed that he was in good health. With the use of moderate physical restraints and with his mother present, he was positioned on the operating room table and general anesthesia was induced with 8% sevoflurane by inhalation. After induction, intravenous access was established and nasotracheal intubation was done with no complications, and the patient was maintained on a combination of anesthetic agents.

The following dental care was then provided: supra- and subgingival scaling with an ultrasonic scaler, dental polishing, 8 dental restorations, and a simple extraction of the upper-right third molar (tooth 28). No intraoperative complications occurred and all vital signs were within normal limits throughout the procedure.

While being prepared for emergence from the general anesthesia and subsequent extubation, the patient was breathing spontaneously. However his oxygen saturation level fell into the 60% to 70% range while he was on 100% oxygen. At this point, a bronchoscopy was done and a significant amount of purulent exudate was found in the lower lobe of his right lung. A portable chest radiograph revealed consolidation in his right lung that could represent atelectasis and a mild opacity medially at the left base (**Fig. 1**). He was manually ventilated and promptly transferred to the intensive care unit, started on a 7-day course of moxifloxacin, stabilized and extubated the next day, and discharged in good condition 5 days later with instructions to see his family physician in a week. The final discharge diagnosis was an aspiration hypoxic episode during the general anesthesia for dental treatment.

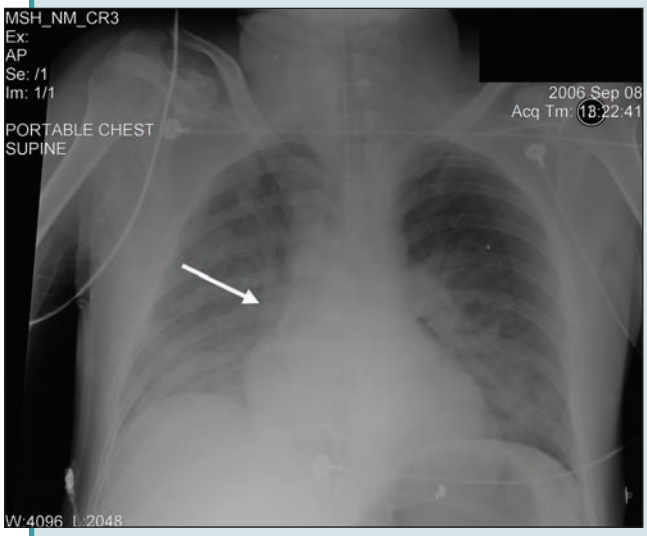

Figure 1: Portable chest radiograph of patient. During extubation, the oxygen saturation level had fallen to the 60% to 70% range. As a result, a bronchoscopy was done, which revealed purulent exudates in the lower right lung. A chest radiograph was then taken while the patient was in the operating room. The consolidation seen in this patient's chest radiograph suggests that the infection was subacute and present before the patient's assessment for general anesthesia.

Discussion

Every effort should be made to treat persons with developmental disabilities in an ambulatory hospital dental clinic setting with nonpharmacologic behaviour management techniques. After the risks and benefits of various behaviour management strategies are reviewed, informed consent must be obtained from the patient or persons who have the legal authority to provide consent for the proposed treatment. Frequently, the dental care team, with the assistance of the primary home care providers, use protective stabilization to facilitate the required dental care. Conscious sedation is available to manage the uncooperative patient with a developmental disability, but is used infrequently because the results are unpredictable at best.[8] Sedation with nitrous oxide is also unreliable for an uncooperative person with a disability because of the need to inhale through a secure nasal

hood.[8] Oral and intramuscular agents can be used, but there is a high frequency of idiosyncratic responses with marked hyperactivity, followed by a period of sedation after the appointment once the stress from the dental visit has dissipated.[8] More importantly, since the medication is not titrated for the individual patient, a deeper level of sedation may ensue and could place the patient at risk if the airway cannot be safely secured.[8] Intravenous sedative agents can also be used. They allow for titration of the required dose, but many uncooperative patients with developmental disabilities will not allow safe intravenous access without significant physical restraint. Finally, general anesthesia may be considered. It enables the anesthetist to properly secure the patient's airway and monitor his or her physiologic status at all times, allowing an uncooperative patient to receive all necessary dental care (clinical and radiographic examination, and preventive, restorative and surgical treatment) in one treatment session. This approach is a very safe way to provide dental care for the uncooperative patient with a developmental disability.[8,9] The completion of this care subsequently allows the clinician to definitively establish a baseline for the person's oral health and to enable formulation of future preventive strategies.

A review of the literature indicates that about 5% of the population with a disability requires general anesthesia to facilitate comprehensive dental treatment.[10] The primary reason reported for recommending treatment under general anesthesia for persons with a disability is their inability to cooperate with dental care in an ambulatory clinic setting, particularly if they have overt dental disease.[11–13] Societal pressures also play a role; many parents or caregivers are reluctant to consent to the application of physical or conscious pharmacologic restraints. As a result, they insist that the dental care be provided under general anesthesia in the best interests of the patients' psychological health and well-being.[13]

In many hospitals, patients scheduled for general anesthesia must have a separate appointment before the surgery so that an anesthetist can do a comprehensive preoperative assessment, including a review of their medical, surgical and medication history, a physical examination and preoperative tests, as needed. This assessment must be completed 30 days before the surgery.[14,15] If patients are nonverbal, another person must present their medical history; however, the accuracy of such statements, especially if the patients are institutionalized, may be questionable.[7,13] Not uncommonly, cases involving general anesthesia are cancelled because the preoperative assessment was not completed in accordance with the institution's protocol.

In contrast, persons with disabilities have undergone dental surgery under full general anesthesia after minimal preoperative investigations at the Mount Sinai Hospital in Toronto with minimal morbidity or mortality.[9] In a survey[9] of 147 cases done under general anesthesia, only 20 patients had complications, most of which were minor. The more serious complications that developed during the course of their care under general anesthesia could not have been predicted or prevented by a more extensive preoperative assessment. Mount Sinai Hospital's recommendation is that the patient's own physician, who should know the patient's general condition best, complete the medical history before the general anesthetic and the physical examination, and that the dentist and anesthesiologist review these preoperatively.[13] A further benefit of having general anesthesia in a hospital is the ability to do multiple nondental tests or examinations for those patients whose behaviour prohibits such investigations. These investigations may include blood work, a PAP smear, an electrocardiogram, medical imaging or other invasive procedures.

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General anesthesia is relatively safe, but is not without risk. The mortality rate associated with general anesthesia for the sole purpose of comprehensive dental treatment in Ontario is 1.4 per 1,000,000 cases.[16] Most complications are not a result of the anesthesia itself, but occur during the recovery period and involve the respiratory or cardiovascular system. The most common complications reported are nausea, vomiting and a sore throat.[17–19]

The average lifespan of persons with developmental delay is increasing, in part, because of advances in the medical care available to them. As a consequence, the complexity of their presenting medical problems has also increased, and their comorbidities place them at a higher risk of mortality and morbidity while under general anesthesia.[13,19] They have an increased incidence of dysphagia and gastroesophageal reflux disorder, which predisposes them to chronic aspiration and can result in pneumonitis or recurrent chest infections.[9,19]

One of the responses of the dental profession to the reduction in hospital access in Ontario has been to develop general anesthetic facilities in the dental office or a community-based multiuser surgical centre to improve access to care under general anesthesia for healthy uncooperative pediatric patients and dental-phobic adults.[14] The Hospital for Sick Children will no longer treat healthy patients over the age of 3 years who have an American Society of Anesthesiologists' classification of 1 and 2. The hospital refers these patients to the community and instead focuses its limited operating room time on treating those with significant medical

comorbidities. Even with this change, the current waiting time for dental care under general anesthesia is 9 to 12 months, which is longer than the target times. During this waiting time, patients with active caries could be in pain and may develop a major odontogenic infection with the risk of systemic involvement.

Significant costs are associated with the establishment of a community-office general-anesthesia suite; these costs include, but are not limited to, the costs for equipment, staffing and the time spent on each patient. The coverage of dental costs provided by the Ontario government-sponsored plan for persons with disabilities does not provide sufficient remuneration for the anesthesia, dental treatment and overhead costs associated with such a service.[20] As a result, it is cost-prohibitive for a private-practice provider to operate such a facility for persons with disabilities.[20] Because of a lack of funding for dentistry for persons with disabilities, many of these patients cannot access care in a private office, so they are subsequently referred to a publicly funded hospital clinic for their care.[20] In Arizona, Oregon, Tennessee and New York, when the amount of remuneration providers received for treating persons with disabilities was increased, many of them subsequently received treatment in a private-practice setting. [20]

Only those dentists who have received hands-on training in dentistry for persons with disabilities, either in their undergraduate dental curriculum or during specialized training, are likely to be comfortable treating this unique population in their practices.[2,3] As a result, seeking dental treatment in a hospital dental department is the only available option for many of these patients. Most undergraduate dental programs in North America do not include or offer very little hands-on didactic and clinical experience in the dental care of patients with disabilities, thus further contributing to the lack of access to care for these patients in the community.[2,3]

The case study described in this paper demonstrates how quickly an unforeseen, potentially life-threatening complication can occur, and how prompt management and treatment from medical staff while in the operating room enabled this patient to fully recover and ultimately be discharged in good condition. The resources available to an anesthesiologist in a hospital, such as emergency facilities, equipment and staff, are far greater than the resources in a private clinic.[21] Had this event occurred in an office setting, the management of such complications may not have yielded such a positive outcome. The health care system needs to increase the funding for hospital dental departments to decrease the waiting times for dental care under general anesthesia in a hospital and to provide dental students with further training in dentistry for persons with disabilities. Dentists who have received this additional training would be more inclined to treat persons with disabilities. Collaboration between these dentists in the community and hospital dental departments could result in regular dental maintenance care being provided in the community and required comprehensive dental care under general anesthesia, in the hospital. This arrangement could ease some of the burden placed on hospital dental departments.

The management of persons with disabilities is complex. Their dental care, even minor treatments, requires the most time to complete, yet the level of remuneration does not adequately cover the costs of this care. Moreover, the most severe adverse events associated with general anesthesia cannot be predicted nor prevented, so in the interest of patient safety for persons with disabilities, the hospital is the ideal location to provide such care. This complex care, whether in the community or in the hospital, requires increased funding from government programs.

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