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Hospital Dental Services for Children and The Use of General Anesthesia

A Project Submitted to
The College of Dentistry, University of Baghdad,
Department of Pedodontics and Preventive dentistry in
Partial Fulfillment for the Bachelor of dentistry

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Certification of the Supervisor

I certify that this project entitled "**Hospital Dental Services for Children and the Use of General Anesthesia**" was prepared by the fifth-year student **Haider Raed Aziz** under my supervision at the College of Dentistry/University of Baghdad in partial fulfilment of the graduation requirements for the bachelor's degree in Dentistry.

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DEDICATION

I'd like to dedicate this project to my beloved **father** and my beloved **mother** without both I would never make it to this point.

To all my **friends**, thank you for being always there for me with all your love and support.

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DGA	Dental General Anesthesia
ECC	Early childhood caries
GA	General Anesthesia
IV	Intra venous
MH	Malignant hyperthermia
PALS	pediatric advanced life support
PONV	Post operative nausea and vomiting
SHCN	Special health care need

Introduction

General anesthesia (GA) is a state of a controlled loss of consciousness using both intravenous drugs and gas inhalation (Torpy *et al.*,2011).

Under the influence of anesthetic medications, patients lose the ability to feel any stimulus no matter how painful it is, and the body's natural reflexes are lost as well (Revision,2018).

Dental general anesthesia (DGA) is a widely used technique in pediatric dentistry. It facilitates the delivery of proper treatment to children with severe dental decay who cannot cope with treatment in the conventional dental setting due to anxiety or limited cooperation ability (Karim *et al.*,2008).

There are several indications for DGA in children, but caries is generally the most common cause. Occasionally some healthy and Special health care need (SHCN) patients require treatment under (GA) due to congenital disorders or traumatic accidents Even though some risks are associated with DGA, it remains a safe procedure overall (Martins-Junior *et al.*,2013).

DGA comes with a high cost and requires unique equipment; nonetheless, both dentists and parents find it an acceptable way of treating children (Ramazani,2016).

A study that assessed the mortality of dental GA by a review included 20 studies from 1955 to 2017 concerned with deaths associated with dental GA. They found 218 deaths out of 71,435,282 patients (3 deaths per 1,000,000 persons) with a mortality rate of 1:327,684 (Mortazavi *et al.*, 2017).

multiple researchers have proven that single, brief exposure to these drugs presents a minimal risk for neural growth and development (Dimaggio *et al.*,2011).

Dental pain was the most common postoperative dental morbidity during the first 3 days after dental GA. Therefore, The Royal College of Anesthetists guidelines recommends using sedation instead of dental GA whenever suitable (Hulin ,2015).

Aim of the study

Aim of study to review all aspects of treatment for children in the hospital and under General anesthesia.

Review of the literature

1. Obtaining Hospital Staff Privileges

Requirements for obtaining hospital staff privileges vary among institutions. The dentist must fulfill the following three basic requirements to become a hospital staff member:(American Academy of Pediatric Dentistry,2022)

1. The applicant must have graduated from an accredited dental school.
2. The applicant must be licensed to practice dentistry in the state in which the facility is located.
3. The applicant must have high moral and ethical standards.

Additional requirements may have to be met to obtain staff privileges. In a children's hospital, dentists might be required to have adequate advanced training to treat and manage children in the hospital. The requirements may include a dental residency of 1–4 years in a teaching hospital in which the dentist (1) gains experience in recording and evaluating the medical history and current medical status of children.(2) receives instruction in physical examination techniques and in recognition of conditions that may influence dental treatment decisions; (3) learns to initiate appropriate medical consultations when a problem arises during(4) learns the procedure for admitting, monitoring, and discharging children; and (5) develops proficiency in operating room protocol. A rotation in which the dental resident was actively involved in administering general anesthesia to children is highly desirable. Current certification in basic cardiopulmonary resuscitation should be maintained by all members of the hospital's professional staff, including dentists. It is highly desirable to have participated in a pediatric advanced life support (PALS) course as well (Jeffrey,2011).

2. Indications for General Anesthesia in the Treatment of Children

The use of general anesthesia (GA) for dental care in children is sometimes necessary for safe, efficient, and effective care (Jeffrey,2011)

Children with special needs are defined by having any physical, developmental, mental, sensory, behavioral, cognitive, or emotional disabilities that require differentiated medical treatment, special medical intervention, and/or use of specialized services or programs. This definition can be applied in dental care, when due to the above characteristics these children require the use of appropriate behavioral guidance techniques, conscious sedation, or general anesthesia (Newacheck *et al.*,1998).

GA is an efficient and safe resource for patients whose special characteristics make it impossible for treatment to be performed under local anesthesia or conscious sedation. Health services and treatment policies with respect to the General Assembly vary from country to country (Robertson *et al*; 2012., Cantekin *et al*.,2014).

The use of GA is increasing in patient profile, as preschoolers under the age of six and/or with mental disabilities lack the psychological maturity needed to tolerate dental treatment. Particular attention should therefore be paid to oral health promotion and education, as well as early prevention in pregnant women and to risk groups such as disabled patients (Foley *et al*.,2001; Ibricevic *et al*.,2001)

Similarly, despite an overall decrease in the prevalence of tooth decay and advances in preventive dentistry, restorative treatment and dental extractions are on the rise in this group of patients with special needs compared to healthy subjects of similar age, especially in the group of the mentally disabled. If we want to offer better quality of care, it is necessary to have adequate dental treatment under GA to improve the efficacy and safety of treatment and establish best clinical practices. This requires careful analysis of clinical evidence in order to provide adequate support for these children, taking great care to avoid further withdrawal as much as possible (López-Velasco *et al.*,2021).

If the benefits of the procedure outweigh the risk of anesthesia, there are few if any contraindications to general anesthesia. However, when a concern about the medical condition exists, consultation with an anesthesiologist would be desirable. Patients for whom general anesthesia is usually contraindicated include those with a

medical contraindication to general anesthesia and healthy and cooperative patients with minimal dental needs (Jeffrey,2011).

3.Psychological Effects of Hospitalization on Children

Hospitalization is a frequent source of anxiety for children.20%–50% of children demonstrate some degree of behavioral change after hospitalization. Separation of the child from the parent appears to be a significant factor in post hospitalization anxiety, although other causes are also documented. Allowing the parent to stay with the child during the hospitalization, and especially to be present when the child leaves for and returns from surgery, can reduce anxiety for the child and parent alike (king and Nielson,1976).

According to Camm *et al*. (1987) postoperative behavioral changes reported by mothers of a limited sample of children who received dental treatment with general anesthesia in a hospital were like those observed in children who received treatment under conscious sedation in a dental clinic. Mothers of children receiving dental treatment with general anesthesia in a hospital setting were found to experience more stress during the procedure. Ways to decrease these stresses include providing a prior tour of the operating room facility, informing the parents of the status of the child during the procedure, and letting them know that “everything is all right.

About 75% of the children receiving general anesthesia exhibited some type of behavioral change.Positive changes included less fuss about eating, fewer temper tantrums, and better appetite. Negative changes included biting the fingernails, becoming upset when left alone, being more cautious or avoiding new things, staying with the parent more, needing more attention, and being afraid of the dark. Ways to minimize negative changes include: (1) involving the child in the operating room tour; (2) allowing the child to bring along a favorite doll or toy;(3) giving pre-induction sedation;(4) providing a nonthreatening environment;(5) giving post-procedural sedation as needed; and (6) allowing parents to rejoin their children as early as possible in the recovery area. Some centers allow parents to be present at the induction of anesthesia. This decision is at the discretion of the anesthesiologist(Jeffry,2011).

Usually, anesthesia is induced when the child breathes anesthetic gases such as sevoflurane and/or nitrous oxide through a face mask. As the child becomes anesthetized, the parent is encouraged to provide calm, loving reassurance until the child is unaware of the parent's presence. For this technique to be effectively utilized, it is mandatory that the operating room team be comfortable with the parent's presence and prepared to care for the parent if he/she were to become distressed. It is also critical that the parent be educated as to what to expect as the child is anesthetized, including the possibility that the child may not readily accept the mask, that the child's breathing may become obstructed or "snory," or that the child's eyes may display abnormal movements as he/she enters the excitement stage of anesthesia. Parental presence can be especially helpful with the child with autism spectrum disorder or with a child who refuses or is resistant to oral sedation such as midazolam (Camm *et al*.,1987).

Another similar technique utilizes certified child life therapists skilled in the application of distraction techniques and play therapy. These personnel must also be educated as to their responsibilities during the induction of anesthesia. Utilization of parental presence or child life therapists can markedly reduce the requirement for oral sedation and thus enhance facility throughput by avoiding any delays in medication administration, emergence from anesthesia, or postoperative observation time required to meet discharge criteria. To limit the severity and duration of psychological disturbances, the dentist should strive to reduce parental apprehension concerning the operative procedure. Because children often sense apprehension in their parents, effectively reducing the parents 'anxiety will put the child more at ease. Thoroughly explaining the procedure, describing the normal post-anesthetic side effects, and familiarizing the child and parents with the hospital can reduce postoperative anxiety(Jeffry,2011).

children treated for early childhood caries (ECC) under general anesthesia or under conscious sedation at a very young age behaved similarly or better in a follow-up examination approximately 14 months after treatment than at their pretreatment visit, as measured by the Frankl scale and by the sitting pattern (Peretz *et al*.,2000).

children were more likely to exhibit positive behavior at their 6-month recall appointment following dental treatment for childhood caries under general anesthesia compared with those treated under oral conscious sedation (Fuhrer *et al*.,2009).

4.Medical History and Physical Examination

The primary steps in preoperative preparation are to determine whether the child is in the best possible state of health, given the child's underlying medical condition, and to manage any concurrent acute interceding illness. The key concept is that the patient's medical condition should be "optimized" when he or she presents to the operating room (OR). The American Society of Anesthesiologists has an established risk-stratification system as seen in table (1)(Kenneth *et al*. ,2014).

Table (1): American society of anesthesiologist's physical status classification system (Kenneth et al;2014).

ASA physical status 1: A normal healthy patient
ASA physical status 2: A patient with mild systemic disease
ASA physical status 3: A patient with severe systemic disease
ASA physical status 4: A patient with severe systemic disease that is a constant threat to life
ASA physical status 5: A moribund patient who is not expected to survive without the operation
ASA physical status 6: A declared brain-dead patient whose organs are being removed for donor purposes

The details of the patient's medical history are not always apparent to the perioperative care team; therefore, the pediatrician's detailed knowledge of the patient's medical history is an especially important area in which he or she can improve overall care for a patient. For example, pediatrician input has been shown to frequently modify the perioperative plan in children undergoing dental procedures (Auvergne *et al*.,2011).

Planning for anesthesia benefits from communication about neurologic development and function, airway anomalies (e.g., difficult intubations, history of airway surgery), cardiac and pulmonary function (including sleep apnea as well as lung disease), coagulation history, endocrine and renal diseases, and history of exposure to chronic opioids, anesthetics, and sedatives. Motion sickness is a risk factor in adults for postoperative nausea and vomiting (PONV) and is very likely a predictor in children as well. This history should be noted, as should a history of PONV with previous surgeries (Gan *et al*.,2007).

General psychosocial history can guide perioperative management. Conditions such as severe anxiety or posttraumatic stress disorder or conditions that impair the child's ability to process information (e.g., attention-deficit disorder) or interact with strangers under stressful conditions (e.g., oppositional defiant disorder, autism spectrum disorders) should be conveyed to the anesthesia care team. Before elective procedures, consultation with a psychologist to aid in preparing the family and child with these severe cognitive and emotional disorders may be helpful as well (Auvergne et *al*.,2011).

The medical history should include the following information according to Jeffry, (2011)

1. Allergies and previous allergic or adverse drug reactions.
2. Current medications, including dosage, time, route, and site of administration for prescription, over the counter, herbal, or illicit drugs. Many drugs, including herbal agents (e.g., St. John's wort, echinacea, kava, valerian), may alter drug pharmacokinetics, prolonging the effects of sedative agents.
3. Diseases or abnormalities in the patient, including pregnancy status of adolescents and neurologic impairment that might increase the potential for airway obstruction, such as a history of snoring or obstructive sleep apnea.
4. Previous hospitalizations, including the date, purpose, and hospital course.
5. History of general anesthesia or sedation and any associated complication.
6. Family history of diseases and sedation or anesthetic complications.

7. Review of body systems.

8. Age (in years and months) and weight.

9. Name, address, and contact information of the child's medical home.

According to Jeffry, (2011) the physical evaluation should include the following:

1. Height and weight.

2. Vital signs, including heart and respiratory rates, blood pressure, and temperature. If determination of baseline vital signs is prevented by the patient's physical resistance or emotional condition, the reason(s) should be documented.

3. Evaluation of airway patency to include tonsillar size and anatomic abnormalities that may increase the risk of airway obstruction (e.g., mandibular hypoplasia, large, short neck, limited mandibular range of motion).

4. Physical abnormalities or conditions that may affect routine intraoperative monitoring (e.g., recent orthopedic injuries to arms or legs, active skin rashes).

5.Inhaled General Anesthesia and Conduct of Anesthesia

Inhalation anesthetics (nitrous oxide, halothane, isoflurane, desflurane, sevoflurane, most used agents in practice today) are used for induction and maintenance of general anesthesia in the operating room. The volatile anesthetics (halothane, isoflurane, desflurane, and sevoflurane) are liquids at room temperature and require the use of vaporizers for inhalational administration. Nitrous Oxide is already under normal conditions of temperature and pressure. All inhalational anesthetics provide amnesia and immobility, except for nitrous oxide, which also provides analgesia. Inhaled anesthetics are commonly used in combination with IV anesthetic agents (Amanda *et al*.,2022).

The most used anesthetic gases are halothane, nitrous oxide, isoflurane, sevoflurane, and desflurane. The primary mode of administration is by inhalation through a face mask, laryngeal mask airway, or a tracheal tube. They can be useful for preoperative sedation in addition to intravenous (IV) anesthetic agents such as

midazolam and propofol in the perioperative and intraoperative setting (Brown *et al*.,2018).

The gold standard to measure potency is the minimum alveolar concentration (MAC), defined as the minimum alveolar concentration of inhaled anesthetic, at which 50% of people do not move in response to a noxious stimulus (Aranake *et al*.,2013).

The most common adverse effect of inhaled anesthetic agents is postoperative nausea and vomiting (PONV). There has been some evidence showing that intravenous anesthesia instead of inhaled agents reduces the risk of PONV (Scheiermann *et al*.,2018).

Independent of the source, usually anti-emetic agents such as ondansetron, metoclopramide, and/or dexamethasone are administered both prophylactically and symptomatically to reduce the incidence of nausea and vomiting (Brown *et al*.,2018)

Malignant hyperthermia (MH) is also an adverse effect that can occur with the administration of inhaled anesthetics, most seen with the inhaled gas halothane. Patients susceptible to this adverse effect have heritable alterations between their proteins and muscular cytosolic concentrations of Ca2+(Hopkins *et al*.,2018).

When exposed to anesthetic gases, there is an excessive release of Ca2+ in the skeletal muscle causing the patient to exhibit symptoms such as hyperthermia, tachycardia, muscle rigidity, hyperkalemia, and metabolic imbalances. Reversal is achievable by administering dantrolene and restoration of normal body temperature, and correction of metabolic imbalances (Rosenberg *et al*.,2015).

Patients with a known history or family history of MH should avoid volatile inhalation agents and other precipitating agents such as succinylcholine. Typically, the volatile agent vaporizers are completely removed from the anesthesia machine, and it is flushed with high flow air or oxygen for an hour before being used with a susceptible patient. A few inhalation agents are known to irritate the airways of patients with severe asthma and induce bronchospasm due to the pungent smell on induction, primarily with desflurane and isoflurane. Other agents like sevoflurane can be used in asthmatic patients to help relax the airways on induction as they do not have such pungent smells.

Isoflurane, sevoflurane, desflurane will decrease systemic vascular resistance leading to a drop in systemic blood pressure. These changes are more profound in hypovolemic patients. Nitrous oxide can cause diffusion hypoxia quickly following discontinuation of the agent. It is recommended that 100% FiO2 be used to counteract the rapid dilution of O2 in the alveoli (Amanda *et al*.,2022).

6.Toxicity of inhaled General Anesthesia

It is worth mentioning that there is no pharmacological intervention for an overdose of inhaled anesthetics. In an overdose incident, the primary treatment method is supportive, with optimal ventilator settings and alveolar clearance. Several rare acute and chronic toxicities can occur with inhaled agents. Acute toxicities include carbon monoxide poisoning (CO2), nephrotoxicity, and hepatotoxicity. Chronic toxicities include hematotoxicity, teratogenic effects, and carcinogenic toxicities (Amanda *et al*. ,2022)

The dose of Nitrous Oxide necessary used in a routine anesthetic can cause diffusion hypoxia. As gas exits the bloodstream into the lungs, the nitrous oxide displaces air and oxygen from the alveoli. This can be ameliorated by using supplemental oxygen to displace and dilute the nitrous oxide (Amanda *et al*.,2022).

Nephrotoxicity occurs most commonly with sevoflurane as its metabolism occurs at a much faster rate than other gases. This faster rate of absorption causes high levels of inorganic fluoride, which correlates with renal impairment. While this observation has largely occurred in research studies, the clinical recommendation remains to avoid sevoflurane in patients who have known renal dysfunction (Dayan,2016; Ong Sio *et al*.,2017).

The possibility that anesthetic agents might cause neurotoxicity and resultant learning deficits in young children has become an important topic over the past few years. Pediatric anesthesiologists and dentists have been asked by parents and caregivers about toxic effects and long-term cognitive and behavioral outcomes. This issue was first recognized in animal studies in the early 2000s(Jeffry,2011).

7.Anesthetic Preparation of the Child

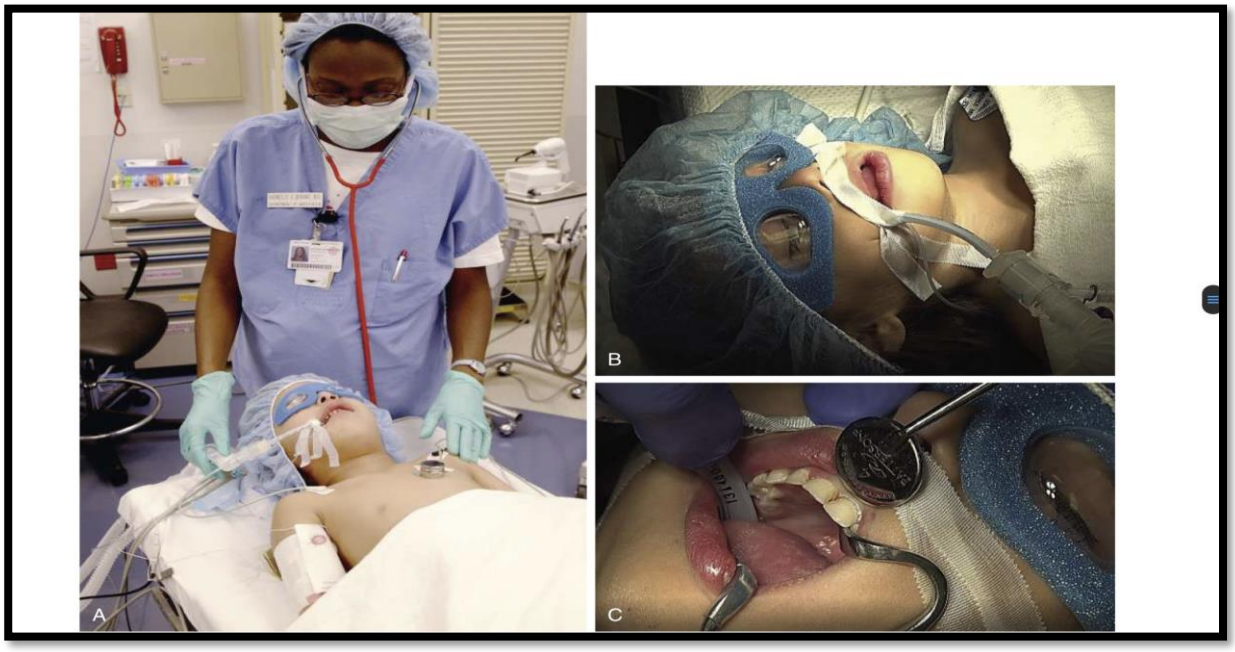
After donning operating room attire, the dentist should report to the surgical suite and inform the anesthesiologist of any special requests concerning the procedure before the induction of anesthesia. When the patient enters the operating room, the mandatory "time-out protocol," usually initiated by the circulating nurse, identifies the patient, allergies, planned medications, and proposed treatment to the dentist and anesthesiologist before induction for the child's safety (Jeffry,2011).

Nasotracheal intubation is preferred to ensure good access to the oral cavity. However, a history of epistaxis or certain medical comorbidities may make nasotracheal intubation relatively contraindicated. One technique for nasal endotracheal intubation utilizes a latex-free red rubber catheter to serve as an atraumatic dilation device to prevent the passage of the hollow-pointed endotracheal tube through the nasopharyngeal tissues (Ray and Tobias,2003).

Orotracheal intubation is not contraindicated, however, and can be used in a dental case with minimal restorative needs. In this event, the anesthesiologist will typically place the endotracheal tube to the least affected side of the oral cavity first and then move it to the other side after treatment of disease not obscured by the tube is completed one must recognize that complications related to the administration of general anesthesia (i.e., laryngospasm, tooth avulsion or aspiration, traumatic intubation, compromised airway, and malignant hyperthermia) are possible and may require expert management by the anesthesiologist(Jeffry,2011).

The anesthesiologist is responsible for starting intravenous fluids, securing the necessary monitoring equipment, performing the intubation, and stabilizing the endotracheal tube. The anesthesiologist will select the type of intravenous fluid, calculate the estimated fluid replacement and fluid deficit volumes, and perform a physical assessment of dehydration. The monitoring equipment should include (1) an automatic sphygmomanometer;(2) electrocardiographic leads;(3) a temperature monitoring device;(4) a pulse oximeter;and (5) a capnography device. The anesthesiologist must confirm that the child is in stable condition prior to the onset of

the dental operation. If orotracheal intubation is used, special attention is focused on optimal tube placement as in Figure (1) (Jeffry,2011).



Figure(1):(A) Patient is in a stable anesthetic condition and ready for the dental procedure. Notice the position of the precordial stethoscope, blood pressure cuff, and orotracheal tube. (B) This shows the position of the orotracheal tube taped to the far-right side of the mouth. Note the tape is solely on the maxilla to not impede mouth opening. (C) This shows the intraoral portion of the orotracheal tube. Note the tube is positioned buccal to the maxillary second primary molar to allow access to most of the oral cavity. If work in that quadrant is impaired by the tube, it can be moved and taped to the other side (Jeffry,2011).

Special care is taken to protect the child's eyes as in Figure (2). In addition, a shoulder roll is placed, padding is added to the patient's pressure points, the endotracheal tube and head are stabilized, heating or cooling blankets are used as needed, and the safety belt is secured. The dentist has the table positioned to conduct dental procedures, and the anesthesiologist administers any preoperative intravenous medications requested (Jeffry,2011).

Figure (2): A special eye guard protects the patient's eyes during the procedure (Jeffry,2011).

Before scrubbing, the dentist should obtain any necessary preoperative radiographic studies. All persons involved in the radiologic procedure should wear protective lead apparel. Radiographs of excellent quality can be made while a patient is under general anesthesia without exposing the patient or staff to unnecessary radiation as in Figure(3). Digital radiographs are advantageous because radiation exposure is decreased, and image feedback is immediate (Jeffry,2011).

Figure (3): Obtaining diagnostic radiographs. Notice the use of protective lead gloves, thyroid collar, gown, and lead aprons. The blue plastic bag lying over the patient contains a protective lead apron that will be replaced by a surgical patient draped at the conclusion of obtaining x-rays and before initiating the surgical procedure (Jeffry,2011).

8.Perioral Cleaning, Draping, and Placement of pharyngeal Throat Pack

Before the dental procedure is begun, the perioral area is cleansed with sterile 4 × 4-inch gauze pads. The first gauze pad is saturated with a bacteriostatic cleaning agent and the second gauze pad with sterile water. Alcohol is not used in the operating room because it is a potential fire hazard. This procedure is intended not to sterilize the area but only to remove gross debris as in (Figure 4) (Jeffry,2011).

Figure (4) Special care must be taken during perioral cleaning to prevent materials from entering the oral cavity.

A surgical sheet is then positioned over the remainder of the child's body. This helps maintain body temperature and provides a clean field during the procedure. The head is draped with three towels arranged to form a triangular access space for the mouth. The towels are secured in place with towel clamps or hemostats. The mouth should be fully exposed as in Figure (5) (Jeffry,2011).

Figure (5): Placement of the surgical sheet and triangular draping of the oral cavity area. The nasotracheal tube is exposed to allow for easy monitoring of its connections.

The anesthesiologist may request that part of the nasotracheal tube remain exposed so that all connections can be easily monitored. The assistants then place all supporting carts and stand around the table in positions that the dentist finds comfortable and efficient. The example set-up of the surgical suite provided is only a suggestion; the final positioning of equipment and individuals is at the discretion of the surgeon and surgical staff. The patient's mouth is opened with the aid of a Molt mouth prop. Care should be taken not to impinge on the lips or tongue with the prop. The mouth is thoroughly aspirated. The pharyngoplasties' area is sealed off with a strip of moist 3-inch sterile gauze approximately 12–18 inches long. Written documentation of throat pack placement and removal is required on the physical history form of the medical chart. This packing reduces the escape of anesthetic agents and prevents any material from entering the pharynx. The gauze should be tightly packed around the tube so that a good seal is ensured. Once the pack is in place, a thorough intraoral examination is performed, followed by dental prophylaxis. The dentist should then evaluate any new radiographic studies that have been obtained and formulate a final treatment plan (Jeffry2011).

9.Restorative Dentistry in the Operating Room

Instruments used for restorative dental procedures in the operating room are the same as those used for procedures in the dental operatory. Local anesthesia may be used to minimize pain and bleeding. The use of local anesthesia can decrease the anesthetic requirements or need for postoperative opiate analgesia and thus decrease postoperative side effects such as nausea(jeffry,2011).

According to Spiro and Burns (1980) found that they were able to treat seven teeth per hour in children under general anesthesia compared with only three teeth per hour in children of similar age in a clinic setting.

The use of quadrant isolation with a rubber dam is preferred. After the completion of all dental procedures, a topical fluoride varnish should be applied before the throat

pack is removed. Documentation of dental procedures, extracted teeth, sutures, blood loss, and hydration in the medical chart is required(jeffry,2011).

Eidelman *et al*., (2000) reported that the quality of restorative treatment performed was better under general anesthesia than under conscious sedation.

Restorative dental care under general anesthesia allows for excellent patient compliance and the easy achievement of a well-lighted field, and therefore increases the quality and quantity of dental care while decreasing the anxiety level for the clinician and patient during dental treatment(jeffry,2011).

The dentist should place restorations that will provide the greatest longevity with the least amount of maintenance, for example, full-coverage stainless-steel crowns rather than large amalgam restorations on posterior primary teeth. In a 3-year study of comprehensive dental cases treated under general anesthesia (Eidelman *et al*.,2000).

Stainless-steel crowns to be significantly more successful (3% failure rate) than amalgam composite restorations 29% failure rate (O'Sullivan and Curzon,1991).

A 6-month retrospective study by Tate *et al.* (2002), to assess the failure rates of dental restorative procedures performed under general anesthesia by pediatric dental residents found stainless-steel crowns to be best (8%), followed by amalgam (21%) and composite (30%); composite strip crowns (51%) had the lowest successful restorative treatment rate.

In a 6- to 27-month postoperative period following general anesthesia. Al-Eheideb and Herman (2003), reported similar values, with stainless-steel crowns (95.5%) being more successful than amalgams or composite restorations (50%). Pulpotomies had an extremely high success rate (97.1%), whereas sealants were retained only 68.3% of the time. In a 30-month longevity study of over 1000 composite restorations completed in the operating room.

Bücher *et al. (*2013), noted a high success rate (81.5%). In another study of composite strip crowns, Kupietzky *et al.* (2003), found them to be aesthetic and durable, with an 88% overall retention rate after 6 months.

In the sample of pediatric dental patients treated under general anesthesia in a postgraduate dental hospital in Dubai Mohammad (2016) concluded the following:

1- Pre-formed Stainless-Steel Crown were the predominant modality of restorative treatment over composite restorations and zirconia crowns.

2-ECC and pre-cooperative stage were the main reasons leading to Dental General Anesthesia.

3-Comprehensive treatment plans, which consisted mainly of dental extractions and fewer pulp therapies, were found to have been conducted in those Special Health Care Needs children, accompanied by a notable increase in preventive interventions when compared to healthy patients.

4-Different treatment approaches were observed between Special Health Care Needs and healthy children.

5-A major finding was that many children were not brought-in following dental general anesthesia and had frequently missed recall appointments. This increased the likelihood of developing new carious lesions and consequently increased the need for further dental treatment.

10.Completion of the Procedure

The anesthesiologist should be notified 10 minutes before the completion of the procedure so that the child can begin to be aroused and preparations can be extubation. The recovery room personnel are notified that the child will soon be arriving so that they can begin preparations. On completion of the dental procedure, the oral cavity is thoroughly debrided, and the throat pack is removed carefully to prevent aspiration of any materials that might be lodged against it. The “end time-out protocol” is called by the circulating nurse to identify any patient safety concerns. The dentist verbalizes a needle and sponge count and removal of the throat pack to the nurse. The anesthesiologist then brings the patient through emergence, and the trachea is extubated. The dentist should remain in the operating room during the extubation process to assist the anesthesiologist if necessary. When the child is transported to the

recovery room, the dentist should accompany the anesthesiologist and provide assistance during transportation (Jeffry,2011).

Conclusion

The dental treatment under GA for children is one of solutions for certain cases. It Requires special Privileges for hospital stuff. It requires postoperative care and follow up.

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