Anaesthesia techniques for dental patients with uncommon diseases. A series of case report

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Abstract

Anaesthesia techniques for dental procedures are rarely debated among dentists and anaesthesiologists. Recommendations, indications and contraindications for sedation and/or general anaesthesia in dentistry are not so clearly established. Published scientific evidence are lacking and all the recommendations are therefore based on strong agreement among professionals. Indications for dental treatment under general anaesthesia may be related to patient’s condition, to intervention or to local anaesthesia problems. Known contraindications to this treatment are the refusal by patient and/or patient’s relatives or legal representative and conditions of major risks (ASA III-IV patients). It is wide accepted, among dentists, that LA, along with iatrosedation should be routinely employed as the first treatment step. The next step should be the addition of conscious sedation, if needed, while GA should be considered as the last resort. First and second steps should be performed by the dentist also defined “sedationist”, in this setting. Benefits and risks of general anaesthesia should be considered before taking a decision, and minimal requirements are a pre-anaesthesia consultation providing information to patients and obtaining informed consent. In this paper we report our experience regarding the management of dental patients affected by uncommon systemic diseases and our opinion regarding this issue.

Introduction

Anaesthesia techniques for dental procedures are a rarely debated topic. Recommendations, indications and contraindications for sedation and/or general anaesthesia (GA) in dentistry are not so clearly established. Published scientific evidence are lacking and all the recommendations are therefore based on strong agreement among professionals[1-3]:

1) Indications related to the patient’s condition:
   - behaviour that prevents dental assessment/treatment (attempts at the dentist’s chair have failed);
   - urgent major dental treatment is needed before emergency surgery or medical treatment (oncology, cardiology, organ transplantation);
   - limited mouth opening and/or strong gag reflex precluding examination/treatment;
2) Indications related to the intervention:
   - long, complex, multiple procedures at a single session;
   - loco-regional infection requiring emergency intervention;
3) Indications related to local anaesthesia (LA):
   - known contraindications to LA (allergy confirmed by tests);
   - impossibility of achieving an adequate level of LA after repeated attempts.
4) Contraindications:
   - refusal by patient and/or patient’s relatives or legal representative;
   - major risks of anaesthesia: ASA III-IV patients (relative);

It is wide accepted, among dentists, that LA, along with iatrosedation should be routinely employed as the first treatment step. The next step should be the addition of conscious sedation, if needed, while GA should be considered as the last resort. First and second steps should be performed by the dentist also defined “sedationist”, in this setting [1]. Benefits and risks of GA should be considered before taking a decision, and minimal requirements are a pre-anaesthesia consultation [2-4], providing information to patients (and their legal representative) and obtaining informed consent. In this paper we report our experience regarding the management of dental patients affected by uncommon systemic diseases and our opinion regarding this issue.

Case Report(s)

All the children were evaluated preoperatively by dentist and anaesthesiologist, to assess the ASA physical status classification and the anxiety/cooperation level, to plan the best management for any individual patient. At our department the first approach is performed by the dentist, at the dental chair, through iatrosedation associated to topical anaesthesia (Emla cream-ASTRA®) followed by LA. Conscious sedation, with oral/nasal midazolam, is added, if necessary, by the sedationist. If this technique is not successful the patient is scheduled for management in operating...
room. In table 1 we present the features of 9 clinical cases. The patients are all children affected by uncommon systemic diseases and dental problems, a setting more ever frequent, tanks to the modern medicine evolution. Some of the reported cases are extremely rare and pose these patients at an elevated ASA risk classification (ASA class III-IV) with objective difficulties for the dental treatment. The best management of these patients is performed by a skilled team including the dentist, the anaesthetist, the paediatrician, the psychologist and other specialists all working together for the best results in terms of general and dental health. It is not possible to give an exhaustive description of the rare diseases collected in these case reports, but the interested reader has many references to study [5-10].

Discussion

Provision of adequate pain and anxiety control is both a right for the patient and a duty placed on the dentist. As a matter of fact, the use of sedation is still a limited practice among European dentists: in Italy sedation is provided mainly by anaesthesiologists (94%), seldom by dentists (6%) [1]. Education is carried out on theoretical basis, while practice on the patient is lacking in the majority of the European Dental Schools. Also in dentistry the most important part of the care of any patient who requires management is the patient assessment [4]. This is particularly the case when dealing with medically compromised patients like the 9 children here presented. We stress here that there is no place to fully discuss the specific features of the uncommon diseases presented by our patients. The purpose of the assessment is to reach a decision as to whether it is necessary to use a particular anaesthesia technique in the management of that particular patient having the specific dental treatment on that occasion. If a sedative technique is appropriate then the assessment must also determine the specific type of sedation/GA to be provided. It is of fundamental importance to have an understanding of the patients' underlying medical condition, but in dentistry, frequently this is an underestimated part of the consultation process. As part of the history taking there should be an exploration of the pattern of the patient's disease. Most notably are there times of the year or times of day when the patient is better able to cope with treatment. If so treatment should be organized accordingly, and success of simple sedation technique is possible, also in very difficult cases (see case number 1, 5 and 7 in table 1). Patients who are assessed as ASA I- II can be treated by a skilled sedationist in a primary care environment. Patients who are ASA III, although frequently better managed under sedation/GA, should be referred to a "specialist" environment for management. Patients who are ASA IV should only receive emergency care in a secondary care setting. In some cases there may be advantages to having a separate sedationist who is able to concentrate fully on the monitoring of the patient rather than assuming the dual responsibilities of both sedating the patient and providing the dental treatment. The sedation technique should be chosen as the most appropriate for the individual and the dental treatment to be performed on that occasion. There are no techniques that are either universally applicable or universally contraindicated: sedation/GA of medically compromised patients needs a well trained and experienced team to provide safe and effective management. GA is associated with some risk and modern dentistry is based on the principle that all potentially painful treatment should be performed under LA if at all possible [2]. Patients whose level of anxiety does not allow this should receive a conscious sedation technique [3]. Complications of modern anaesthesia are rare, but skilled team work is required to prevent permanent harm to the patient. The Royal College of Anaesthetists recommends that only specialist paediatric anaesthetists should administer GA to very young children. Careful selection and anaesthetic treatment by a skilled anaesthesiologist seem to be the key factor for the best management of dental patients with special needs [3,4]. GA should be strictly limited to those patients and clinical situations in which LA (with or without sedation) is not an option. Only a proportion of the general anaesthetics currently administered come within this category and much could be done if good facilities for conscious sedation were more widely available. There must be continued pressure to decrease the number of GA which are administered for little more than patient or dentist preference. There is wide variation in the frequency of use of GA in the different parts of Europe [1-3,11,12] but numbers can be reduced by rigorous pre-operative patient review. The actual European situation clearly illustrates some of the difficulties inherent in developing agreed criteria and guidelines. It might be assumed that there were already some clear criteria for referral but although there was a large measure of agreement between 'experts', the variation seen suggests that not all referring dentists in Europe would necessarily have agreed. Clinical care does not rest on absolutes and guidelines and criteria need to be used with sensitivity, care and wisdom. Decisions about GA can only be made on an individual patient basis, but it is strongly recommended that its use in
dentistry should be limited to clinical situations in which it would be impossible to achieve adequate LA and to complete treatment without pain and for patients who, because of problems related to age/maturity or physical/mental disability, are unlikely to allow safe completion of treatment. The long term aim in such patients should be the graduated introduction of treatment under LA using, if necessary, an intermediate stage employing conscious sedation techniques. Psychological and pharmacological strategies are well established as alternatives to GA for anxiety control and management of the dental patient. Recent developments in the field include inhalational sedation with subanaesthetic concentrations of sevoflurane and sedation with target controlled infusions of propofol. However, because supplementation with other agents such as fentanyl, ketamine or midazolam is usual, the level of sedation achieved can be variable and transient GA with apnoea can occur.

Conclusion

Whilst the dangers of GA have been identified, the morbidity and mortality associated with sedation are not clearly defined [2,3,13]. There is the need of more detailed and evidence-based guidelines on this topic and only well designed studies can help to answer the question.

References

Illustrations

Illustration 1

Table 1. Features of the dental patients affected by uncommon diseases.

<table>
<thead>
<tr>
<th>Sex / age / body weight</th>
<th>Disease / mental status/ASA class</th>
<th>DT</th>
<th>Anaesthesia management / outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Male/11y/42 kg</td>
<td>pyruvate carboxylase deficiency / disabled / III</td>
<td>ME</td>
<td>CS+TA+LA/uneventful (AS)</td>
</tr>
<tr>
<td>2) Female/8y/18 kg</td>
<td>6q imbalance (chromosomal alteration) / disabled / III</td>
<td>ME</td>
<td>TIVA+LA/uneventful (DH)</td>
</tr>
<tr>
<td>3) Female/7y/17 kg</td>
<td>Rett syndrome / disabled / III</td>
<td>ME</td>
<td>TIVA+LA/uneventful (DH)</td>
</tr>
<tr>
<td>4) Female/12y/46 kg</td>
<td>Hereditary angioedema / normal / II</td>
<td>ME</td>
<td>CS + C1-esterase inhibitor + TA + LA / uneventful (AS)</td>
</tr>
<tr>
<td>5) Female/12y/42 kg</td>
<td>Congenital hydrocephalus and cerebellar agenesis / disabled / III</td>
<td>ME</td>
<td>CS+TA+LA/uneventful (AS)</td>
</tr>
<tr>
<td>6) Male/5y/22kg</td>
<td>II / autism</td>
<td>ME</td>
<td>TIVA+LA/uneventful (DH)</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>7) Female/7y/19kg</td>
<td>Cornelia De Lange syndrome / disabled / III</td>
<td>ME</td>
<td>CS+TA+LA/uneventful (AS)</td>
</tr>
<tr>
<td>8) Female/4y/16kg</td>
<td>Moya-Moya syndrome / disabled / IV</td>
<td>ME</td>
<td>TIVA+LA/uneventful (DH)</td>
</tr>
<tr>
<td>9) Female/5y/15kg</td>
<td>Ondine’s Curse, tracheostomy and chronic mechanical ventilation / disabled / IV</td>
<td>ME</td>
<td>Sevoflurane + N₂O / O₂ inhalation+LA/uneventful (DH)</td>
</tr>
</tbody>
</table>

AS: ambulatory surgery; CS: conscious sedation with oral (0.5mg/kg) and/or nasal (0.2 mg/kg) midazolam; DH: day hospital; DT: dental treatment; LA: local anaesthesia; ME: multiple extractions; TA: topical anaesthesia with EMLA cream; TIVA: total intravenous anaesthesia.
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