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Original Article

The frequency and the etiology of re-treatment in patients and candidates for dental procedure under general anesthesia

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ABSTRACT

Background: General anesthesia in dentistry has been widely utilized in cases of uncontrollable fear/anxiety and uncooperative patients, patients of young age, and those allergic to local anesthesia and with other existing systemic diseases. These people usually require re-treatment owing to their weak immunity. Our study investigates the frequency and the prevalence of re-treatment in patients and candidates for dental procedure under general anesthesia in Isfahan during 1393–1396.

Materials and Methods: The present cross-sectional study randomly chose 162 patients who were candidates for dental procedures. Patients who came in for re-treatment twice or more during this period were identified and their records were requested from the archives. Demographic data, reason for using general anesthesia, underlying disease, physical condition, and mental condition were all gathered through a questionnaire. The causative etiology of re-treatment was identified by examining the patients' medical records including restorations, denervation, tooth extraction, filling, and pulpotomy. Statistical analysis was performed using the SPSS software (version 25) and tests such as Kolmogorov–Smirnov Z-test, Spearman, and Chi-square test. $P < 0.05$ was considered statistically significant.

Results: The findings of the present study showed that 92.25% of patients needed dental re-treatment during their second visit. The most needed treatment was in the second repair session and the least was related to prosthetics. It was also noted that 42.15% of patients needed dental treatment at the third visit and the highest need for treatment was in the third prosthesis session and the lowest reason was related to tooth restoration and extraction.

Conclusion: The most needed treatment was in the second session of endodontic treatment, and in the third session, tooth extraction was one of the required treatments, which indicates the progression of dental problems in the interval between treatments.

Key Words: Anesthesia general, dental care, re-treatment

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INTRODUCTION

Teeth play a crucial role in a person's appearance, esthetics, and health, thus requiring constant care and treatment in case of disease. Tooth decay indeed influences a person's quality of life affecting daily habits such as eating, sleeping, and causing pain[1] and besides, in children if left untreated, increases the risk of oral infections[1,2] and could possibly damage permanent teeth as well.[3]

General anesthesia in dentistry serves as a valuable solution in uncooperative patients, which in turn improves the dental health of kids.[4-6] General anesthesia in dental care is used in patients with special needs.[7] Other indications for general anesthesia in dentistry include young age, allergy to local anesthesia, systemic diseases, and unavailability of local anesthesia. Dental procedure under general anesthesia can be very complicated and tough so, sometimes, it calls for re-treatment.[7,8] Complications in physical condition remain one of the main causes of failure in dental treatments.[9]

On one hand, there has been less treatment success in children with multiple tooth decay.[10] Furthermore, there has been less success in dental treatment under general anesthesia in the cases of early childhood caries.[11] Moreover, multi-dental restorations have been reported to be less durable than single-level restorations in patients.[12] On the other hand, studies have shown that the durability of amalgam and veneer repair had longer durability than composite repair in children who received dental treatment under general anesthesia.[13] Moreover, metal caps were more sustainable than composite repairs in children with special needs who received dental treatments under general anesthesia.[14] A 5-year follow-up of endodontic treatment performed on patients under general anesthesia reported a higher success rate.[15]

Usually, the causes of re-treatment in these patients include amalgam fractures and recurrent caries due to other diseases and poor hygiene. It should be noted that restorations alone do not prevent/curtail tooth decay and must be replaced if they are damaged. According to previous studies, one-third of existing restorations are replaced at every dental appointment. At present, 50% of the dental costs are associated with replacing previous repairs. Replacing restorations increases the risk of cavities, weakens the remaining tooth tissue, and raises the chance of further restoration and susceptibility to damage.[16] Furthermore, there is a significant improvement in preschool children's oral health-related quality of life (OHRQoL) 4 weeks after dental treatment under general anesthesia.[17] Dental treatment under dental general anesthesia has a positive effect on Chinese preschool children's OHRQoL.[18]

The current study aims to investigate the frequency and rate of re-treatment following dental procedures performed in patients under general anesthesia in Isfahan during 1393–1396.

MATERIALS AND METHODS

The current retrospective study following its approval by the research institute/faculty with an ethical code of IR.MUI.RESEARCH.REC.1398.012 was initiated at the School of Dentistry of Isfahan University of Medical Sciences in 1393. At the first stage, we requested the IT department of the faculty for the list of patients who underwent treatment twice or more times in the dental surgical room during 1393–1396. Then, with the coordination of the person in charge of the ward, those files were reviewed and the information was entered manually in the data collection form that was prepared beforehand. Other information such as age, indication of general anesthesia, underlying disease, physical condition, mental condition, and so on was obtained through a questionnaire designed by the researchers. Data were gathered and anonymously recorded by one of the researchers. Medical records of patient cases involving repair, denervation, tooth extraction, filling, and pulpotomy were examined to assess the causes that necessitated re-treatment.

Data analysis was performed using the SPSS software (IBM Crop. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Crop.) at both descriptive and inferential levels. The normal distribution of quantitative data was investigated through Kolmogorov–Smirnov Z-test based on which parametric or nonparametric tests were used to analyze the quantitative data. Spearman/Pearson regression test was used to examine the relationship of quantitative variables, and the Chi-square test was used to examine the relationship of qualitative variables. $P < 0.05$ was considered statistically significant.

RESULTS

A total of 162 patients who underwent re-treatment following initial dental treatment under general anesthesia at the dental faculty during 1393–1396 were

Table 1: Prevalence of mental and physical condition of patients under study

Variable	Healthy, *n* (%)	Mildly impaired, *n* (%)	Severely impaired, *n* (%)	Total number, *n* (%)
Physical condition	50 (30.9)	42 (25.9)	70 (43.2)	162 (100)
Mental condition	49 (27)	27 (16.7)	86 (53.1)	162 (100)
General anesthesia	27 (16)	20 (12)	79 (49)	126 (77.8)
Sedation	9 (5)	21 (13)	3 (2)	33 (20.4)
Under monitoring	3 (1.8)	0	0	3 (1.8)

Table 2: Frequency distribution of the reason for re-treatment in the operating room in healthy people

Reason	*n* (%)
Fear/anxiety	11 (6.8)
Allergy	9 (5.6)
Dental unresponsiveness to anesthesia	3 (1.9)
Nausea	5 (3.1)
Systemic disease	21 (13)
Total	49 (30.4)

investigated. Patients had a mean age of 20.8 years. About 77.8% of patients underwent general anesthesia, sedation was used in 20.4% of the patients, and 1.8% of the patients were placed under monitoring. In addition, 69.1% of the patients were not in good physical condition and 69.8% of the patients were mentally ill and had some degree of disability [Table 1].

Forty-nine (30.4%) out of the 162 patients studied did not have any sort of mental or physical disabilities, and the reason for their re-treatment is given in Table 2.

The average time gap between the second stage and the first stage of treatment was (12.98 ± 13.81) months. Of the eight restorations performed in the second stage, there were five new cases of restorations, and three were related to teeth that had been previously restored. Out of 4.17 cases of endodontic treatment in the second stage, 1.17 cases were related to previously treated teeth, and three cases of new endodontic treatment [Table 3].

The average time gap between the second stage and the third stage of treatment was (9.17 ± 7.6) months. Of the 3.75% of repairs performed in the third phase, all were new repairs. Out of 2.83 cases of endodontic treatment performed in the second stage, 1.83 cases were related to teeth that had already been treated, and one case of new endodontic treatment [Table 4].

DISCUSSION

The findings of the present study demonstrated that among the 162 patients studied, 25.92% of the re-treatment were addressed during the second visit and third visit, of which the majority of the cause was related to repair and the least cause was related to prosthesis. Meanwhile, 42.15% of the re-treatments took place in the third visit, of which the greatest cause was related to prosthesis and the lowest cause was related to repair and tooth extraction. With regard to the frequency of dental visits made on different occasions, usually, the first, second, and third visits were related to new treatments/restorations. Since a higher percentage of the patients under study were under poor physical and mental conditions, so the high prevalence of re-treatment in these patients could be attributed to their poor health conditions.

The findings of our study produced results similar to studies of the past on this topic. Aminian and Jamatloo[19] conducted a study to investigate the reasons behind the frequent re-treatment rates for teeth restoration with amalgam and composite in patients referred to the restorative department of the School of Dentistry of Shahid Beheshti University of Medical Sciences during the academic 2001–2002. The results of this study showed that in the case of amalgam and composite restorations, secondary caries precipitated the replacement of restorations. The second-most common reason for re-treatment in Class I and V amalgam repairs was marginal ditching and in Class II amalgam repairs was overhang. In cases of Class I and V composite restorations, loss of restoration; in Class II restorations, was inappropriate interdental contact; and in Class III and IV composite restorations, the lack of color coordination poses the need for re-treatment. The aforementioned statements agree with the findings of our study which also found secondary caries to be the most common cause of re-treatments associated with restorations.

Another study by Kimyai *et al.*[20] investigated the reasons for re-treatment in amalgam and composite restorations among patients referred to Tabriz Dental School. The participants had previously received amalgam or composite treatment by dental students and became candidates for re-treatment during their second

Table 3: Treatments performed in patients in the second stage

Variable	Repair	Endodontics	Extraction	Pulpotomy	SSC	Prosthesis
Total	8	4.17	5.54	7	5	2.25
New	5	3	2	4	2	2.25

SSC: Stainless Steel Crown

Table 4: Treatments performed in patients in the third stage

Variable	Repair	Endodontics	Extraction	Pulpotomy	SSC	Prosthesis
Total	3.75	2.83	8	3	5	6.4
New	3.75	1	8	0	2	4

SSC: Stainless Steel Crown

visit. A total of 300 defective teeth were selected by simple random sampling. The study derived a statistically significant correlation between the type of restorative material and the reason for re-treatment, and the reason turned out to be secondary/repeated caries associated with both types of restorative materials. The findings of this study suggest that the high prevalence of re-treatments in these patients could be due to the different types of restorative materials used.

A study led by Olcay *et al*. analyzed the factors that influenced the failure of endodontic treatment.[21] One thousand teeth endodontically treated with failed outcomes were examined. Results portrayed that among the 1000 failed outcomes, 28.1% were extracted, 66% were re-treated, and 5.9% underwent apical surgery. When the causes of failure were analyzed, restorative and endodontic causes were more common (43.9%), whereas orthodontic causes are rarely seen.

A study at the University of Michigan in 1985 was carried out by Klausner *et al*.[22] to determine the durability of amalgam restorations as well as the main causes of treatment failures. Of the 551 repair procedures scheduled among 191 respondents, 46% were due to primary caries and 54% were due to amalgam replacement. The most common cause for replacing restorations was secondary caries, and then, the next common cause was weak margins and tooth fractures. These results align with the findings of the current study which also found that 25% of the patients who underwent re-treatment during their second visit and 15% who underwent re-treatment during their third visit, were a consequence of secondary caries, tooth fractures, and amalgam-related factors.

CONCLUSION

The most needed treatment was in the second session of endodontic treatment, and in the third session, tooth extraction was one of the required treatments, which indicates the progression of dental problems in the interval between treatments.

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Conflicts of interest

The authors of this manuscript declare that they have no conflicts of interest, real or perceived, and financial or nonfinancial in this article.

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