Case Report

Dental treatment of a 2-year-old victim of a suicide bomb attack

Katz-Sagi H, Gozal D, Ram D. Dental treatment of a 2-year-old victim of a suicide bomb attack.

Abstract – The purpose of this report was to describe the diagnosis and dental treatment of a 2-year-old girl that was involved in a suicide bomb attack. A 14-months-old infant was severely injured when a suicide bomber detonated an explosive device inside a crowded bus. Her injury was 'multi-system', mainly burns and fragments in her face, eyes and other parts of the body. Fifteen months later, she was brought to the Department of Pediatric Dentistry of the Hadassah School of Dental Medicine and the clinical and radiographic examination showed that she was caries free but there were dental trauma injuries to many teeth. Due to her non-cooperative behavior and the extent of treatment the girl was scheduled for a one appointment treatment under deep sedation. Three days later, she was brought to the Emergency Room of the Department of Pediatric Dentistry complaining of pain on the lower left side of the mouth and a swollen vestibule and face could clinically be observed. The lower left first molar that apparently revealed only an enamel fracture and cracks at the time of treatment, actually revealed a necrotic pulp as a result of the blast. As this girl was caries free, and with no history of dental trauma due to any accident, the only explanation for the response of the pulp was the impact of the blast. In conclusion, the reaction of the dental pulp to the blast of an explosion is different than the reaction to other kind of insult and this should be taken in consideration when treating children after this kind of dental trauma.

The spectrum of pediatric injuries seen after a bomb blast is poorly documented. The pathophysiology of blast injuries differ significantly from other forms of trauma and typically result in large numbers of distinctly patterned injuries (1). The high percentage of maxillofacial injuries confirm that maxillofacial surgeons should form an integral part of a multidisciplinary team (2).

The setting in which the device is detonated has implications on the type of injuries sustained by survivors. The injuries sustained by victims of suicide bombing attacks in semi-confined spaces are characterized by the degree and extent of widespread tissue damage and include multiple penetrating wounds of varying severity and location,

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blast injury, and burns (3). The purpose of this report was to describe the diagnosis and dental treatment of a 2-year-old girl that was involved in a suicide bomb attack.

Case report

On 19 August 2003, a suicide bomber detonated an explosive device inside a crowded bus that was on the way from the Western Wall in Jerusalem to the City Center. This bombing attack generated 148 casualties of whom 22 died immediately. Among the victims were 40 injured children and babies, and two dead infants. A 14-months-old infant was severely injured and treated in the Emergency Department of Hadassah Hospital in Jerusalem.

Her injury was 'multi-system', mainly burns and fragments in her face, eyes and other parts of the body (Fig. 1). At the age of 30 months, she was brought to the Department of Pediatric Dentistry of the Hadassah School of Dental Medicine for a clinical examination.

During the first appointment, dental radiographs were not obtained as the result of her non-cooperative behavior. A clinical examination revealed the following: an apparently caries free dentition, fractures of the right central and lateral upper incisors, both central lower incisors, left lower canine and a sinus tract above the first primary upper incisor (Fig. 2). In addition, an obvious enamel crack of the left lower first molar (Fig. 3).

Due to her non-cooperative behavior and the extent of treatment the girl was scheduled for a one appointment treatment under deep sedation. The parents preferred treatment under deep sedation and not under general anesthesia because of the fact that she had undergone more than eight surgery



Fig. 1. Injuries to the face and eyes.



Fig. 2. Multiple fractures and a sinus tract above the first primary upper incisor.



Fig. 3. Fracture and cracks of the lower left first primary molar.

treatments under general anesthesia during the preceding year.

Sedation treatment considerations

A few days before the required procedure, a telephone evaluation was performed by the sedation team nurse. The child's age, weight and American Society of Anesthiesiologists (ASA) physical status, as well as the type of procedure required and the child's medical history were recorded. An information leaflet was sent to the family by mail, and an explanation of the procedure and preprocedure fasting requirements was provided (6 h for solids and 2 h for clear fluids).

On the day of the procedure, a focused physical examination was performed by the anesthesiologist including an evaluation of the airway. Informed consent was obtained from the parents. EMLA cream (Eutectic Mixture of Local Anesthetics, Astra Pharmaceuticals Ltd, Soblertalje, Sweden) was placed on the dorsum of the child's hand on arrival at the Pediatric Dentistry Department, and 1 h later, she was sedated for the procedure. IV access was established by the anesthesiologist after the child received nitrous oxide by inhalation to overcome her fear of venopuncture.

Induction of sedation was accomplished by IV administration of a bolus of 0.5–1 mg/kg propofol. Maintenance of deep sedation was subsequently achieved with a continuous infusion of 3–6 mg/kg/h propofol, supplemented with intermittent boluses as necessary. The child breathed spontaneously at all times and her vital reflexes remained intact.

The radial pulse, oxygen saturation level, endtidal CO_2 and respiratory rate were recorded continuously using a pulse oximeter and a capnograph at 10-min intervals. Oxygen was administered via a nasal canula during the entire treatment. No signs of respiratory distress were observed. The oropharynx was protected by a rubber dam and



Fig. 4. Radiographic examination before treatment showing a caries free dentition and multiple fractures.

high volume suction was employed to avoid aspiration and possible laryngospasm. The infusion was terminated at the completion of the procedure and after a recovery period of 1 h the child was discharged home by the anesthesiologist.

Dental considerations

After the child was deeply sedated, bite wing and periapical radiographs were obtained. The clinical and radiographic examination (Fig. 4), showed that she was caries free but there were dental trauma injuries to many teeth. The treatment plan was: extraction of the fractured upper right central incisor, and both lower central incisors, restorations with strip crown forms and composite resin of the upper right lateral incisor and the lower left canine. The fractured and cracked lower left first molar was restored with a stainless steel crown. This tooth was clinical and radiographic asymptomatic.

As the deep sedation was not enough to achieve painless dental treatment, local anesthesia with lidocaine 2% with 1:100.000 adrenaline was provided. The treatment course was uneventful and the girl was dismissed after a short recovery time.

Three days later, she presented at the Emergency Room of the Department of Pediatric Dentistry complaining of pain on the lower left side of the mouth and a swollen vestibule and face could clinically be observed. Syrup of Amoxicillin was prescribed (50 mg kg⁻¹ in three doses a day during 7 days) and treatment under conscious sedation was scheduled 1 week later.

She was premedicated with oral Midazolam, 0.5 mg/kg body weight, and was restrained by her mother as her parents did not consent to the use of a Papoose Board. Nitrous-oxide inhalation (2L:2L)



Fig. 5. Radiographic examination 10 months after treatment.

was used during the dental procedure. The child's vital signs were monitored during the whole procedure. Although she was non-cooperative during the dental treatment it was completed.

Local anesthesia was achieved by infiltration, and after the tooth was isolated with a rubber dam a root canal treatment was performed through the stainless steel crown. The roots were filled with Endoflas (Endodontic filling material, Sanlor & cia, Cali-Columbia) and the access was filled with amalgam.

A periapical radiograph was taken immediately after the treatment, and after a short recovery time the child was dismissed. She was brought to the dental clinic after 2 weeks, and on examination healthy tissues could be observed. A clinical examination 10 months after treatment, revealed healthy soft tissues, gums and teeth, and erupted healthy second primary molars. A radiographic examination showed healing and bone remodeling (Fig. 5).

Discussion

After a bomb blast, pediatric patients sustain a high incidence of cranial injuries. Fractures and traumatic amputations are common (1). There is a great deal of experience in Israel's hospitals, and other centers in the world, in managing and treating casualties of suicide bombing attacks (1, 2, 4–7). In most of the cases teams of General Surgery, Otolaryngology-Head and Neck Surgery, Plastic Surgery, Orthopedic Surgery, Neurosurgery, Maxillo-Facial Surgery, and Cardiothoracic Surgery, treat the patients to save their lives. The severity of the injuries depends on the proximity of the victim to the explosive device, the angle at which the victim stands in relation to the center of the explosion, and the height of the explosive device in relation to the victim (3). Traumatic dental injuries, due to car accidents, children's games, or child abuse seem to have a different pattern than trauma due to explosion.

In the present case, it could be assumed that the lower left first molar that apparently revealed only an enamel fracture and cracks at the time of treatment, actually revealed a necrotic pulp as a result of the blast. As this girl was caries free, and with no history of dental trauma due to any accident, the only explanation for the response of the pulp was the impact of the blast. In addition, pulp necrosis was diagnosed in another three teeth (upper right central incisor, and both lower central incisors) that were also caries free.

Conclusion

The reaction of the dental pulp to the blast of an explosion is different than the reaction to other kind of insult and this should be taken in consideration when treating children after this kind of dental trauma.

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