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Case Report

Intracranial hemorrhage after tooth extraction in a patient with chronic disseminated intravascular coagulation

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ABSTRACT

Disseminated intravascular coagulation (DIC) is a condition causing severe bleeding, which requires hemostatic measures be taken after surgical treatment. However, there is no clear method to assess coagulation and bleeding after surgical treatment. Here, we describe a rare case of intracranial hemorrhage after tooth extraction in a patient with chronic DIC associated with aortic dissection. A 76-year-old Japanese male reported spontaneous pain in the upper front teeth region. Tooth extraction was performed based on a diagnosis of severe periodontitis. Four hours after the extraction, re-bleeding from the tooth socket was reported. Moreover, 10 and 20 h after extraction, bleeding occurred from the tooth socket again. In both situations, the bleeding was successfully controlled by pressure hemostasis. Three and 5 days after the extraction, the patient reported to the emergency outpatient care with post-extraction hemorrhage. Twelve days after the extraction, the patient complained of spontaneous severe headache. Computed tomography (CT) of the head was taken and hemorrhage was observed in his left frontal lobe. Thirty-eight days after tooth extraction, brain hemorrhage was spontaneously evoked again. It must be noted that bleeding may occur in any part of the body in patients with DIC and not only at the surgical site.

1. Introduction

Intraoral bleeding from the gingiva or socket commonly occurs in dental and oral surgery patients post-tooth extraction. The bleeding is relatively easy to control professionally by the application of extreme external pressure to the mucosa, or ligation using artery forceps, because it is almost always from a local cause such as inflammation [1]. Occasionally, persistent or intermittent hemorrhage refractory to treatment indicates a general hemostatic disturbance, including coagulation factor deficiencies, fibrinolysis defect, platelet or vascular disorders and effects of anticoagulant medication [2]. Disseminated intravascular coagulation (DIC) is one of the well-known risks of bleeding which requires postoperative bleeding management [1,3]. DIC is a clinicopathological syndrome that complicates a range of illnesses. It is characterized by systemic activation of the pathways that lead to and regulate coagulation, which can result in the generation of fibrin clots that can cause organ failure with concomitant consumption of platelets and coagulation factors that can result in clinical bleeding [4]. Previous reports have shown that persistent intraoral bleeding was the initial sign of DIC [3,5–8]. However, there are few reports on the association between DIC and oral surgery [1,3,5–8]. Here, we describe an unusual case of intracranial hemorrhage after tooth extraction in a patient with aortic dissection associated with chronic DIC.

2. Case report

2.1. Medical history

A 76-year-old Japanese male patient (subject) was referred to the Department of Oral and Maxillofacial Surgery with spontaneous

☆ AsianAOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

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Table 1
DIC condition was observed based on the following laboratory findings on admission: fibrin degradation product (FDP), 178.5 μg/ml; platelet count, 9.1×10^4 μl^{-1}; fibrinogen, 66 mg/dl; and prothrombin time (PT), 13.9 s.

Laboratory finding on admission					
WBC	6880 μl^{-1}		PT	13.9 s	
RBC	3.19×10^6 μl^{-1}	↓	APTT	37.9 s	
Hb	10.4 g/L	↓	FDP	178.5 μg/ml	↑
HCT	31.50%	↓	D-dimer	63.02 μg/ml	↑
PLT	9.1×10^4 μl^{-1}	↓	Fibrinogen	66 mg/dl	↓

pain in the upper front teeth region. The subject had been on medication for hyperthyroidism for 46 years. The subject also reported a history of myocardial infarction 15 years ago, for which he had undergone coronary artery bypass surgery. Moreover, the subject had also reported a history of chronic subdural hematoma for which a drainage operation was performed 4 years ago. Further, 3 years back, aortic dissection occurred for which the subject underwent an aortic valve replacement. Other relevant medical history findings included chronic kidney disease (BUN 32.3 mg/dl, creatinine 1.23 mg/dl) and hypertension, and the subject had been on medication for each for about 40 years. Further, one and half years ago, in the Department of Cardiovascular Medicine, the subject was diagnosed with chronic DIC associated with aortic dissection. The DIC condition was evaluated on admission based on the following laboratory findings: fibrin degradation product (FDP), 178.5 μg/ml; platelet count, 9.1×10^4 μl^{-1}; fibrinogen, 66 mg/dl; and prothrombin time (PT), 13.9 s. Also, D-dimer was reported to be 63.02 μg/ml (Table 1). Chest X-ray showed aortic hypertrophy and a cardiothoracic ratio of 55%, indicating hypertrophy (Fig. 2). The DIC condition worsened and it was not possible to treat the aortic dissection due to the DIC condition. The subject was administered the usual medication regimen (β-blocker, calcium antagonist, nitroglycerine, etc.).

2.2. Management of postoperative hemorrhage in the patient

The maxillary left central and lateral incisors and right central incisor were diagnosed with chronic apical periodontitis and therefore extraction was recommended because of root canal infection. Only panoramic radiography was performed for examination and screening of the dental condition, due to the non-compliance of the patient toward dental intraoral radiograph. Even though the maxillary incisal region was not very clearly seen in the panoramic radiograph it could still be inferred an indication of alveolar bone resorption (Fig. 1). Also the patient complained of spontaneous and severe pain on percussion at the maxillary left central and lateral incisors and right central incisor. Hence, endodontic treatment was performed to avoid the stress and difficulty of controlling post-extraction bleeding due to DIC condition. The pain and other associated symptoms subsided after the root canal treatment.

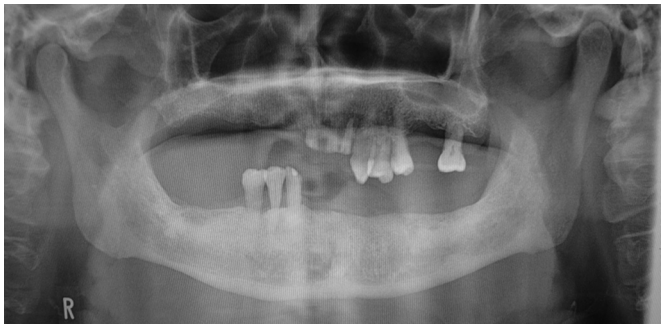

Fig. 1. Initial panoramic radiography of the 76-year-old patient. Panoramic radiograph indicates alveolar bone resorption in the maxillary incisal region.

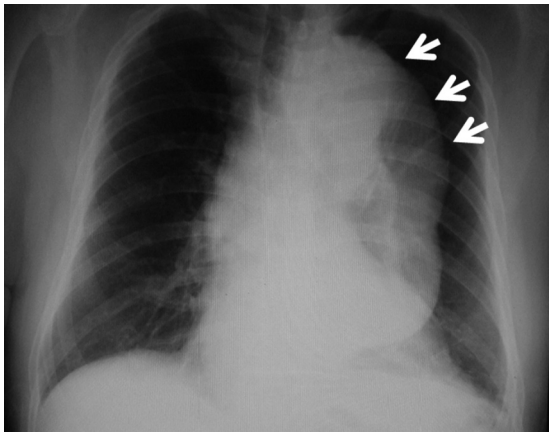

Fig. 2. The AP chest radiograph demonstrated aortic hypertrophy and cardiac dilatation (small white arrow). The cardiothoracic ratio was 55% indicating hypertrophy.

However, 1 month after the treatment, the patient reported with a swelling on the upper incisal mucosa due to re-infection. Hence, tooth extraction under inpatient hospital care was advised to avoid further complications and poor prognosis to endodontic root canal treatment. All three teeth (maxillary left central and lateral incisors and right central incisor) were extracted with extraction forceps. Oxidized cellulose (Spongel, Astellas Pharma Inc., Japan) was placed in the tooth sockets and sutured with silk thread under local anesthesia. However, 4 h after extraction, re-bleeding from the tooth socket was reported. The bleeding was easily controlled with pressure hemostasis using a piece of gauze. However, 10 and 20 h after the extraction, bleeding occurred from the tooth socket again. In both situations, the bleeding was successfully controlled only with pressure hemostasis. Other than these two episodes, no post-extraction bleeding was reported. The local infection and other symptoms of swelling flare and tenderness occur around the tooth sockets on alveolar gingiva. The subject was thus discharged from the hospital 3 days after the extraction without any other associated and non-associated symptoms in general. However, post-extraction hemorrhage occurred again and the subject visited the emergency outpatient care. Hemostasis was achieved using a local anesthetic, oxidized cellulose and silk thread. Five days after the extraction, bleeding occurred again. A custom-made splint was applied to the incisor region for bleeding control. Twelve days after the extraction, the patient visited the outpatient clinic for follow-up of the hemorrhage caused by the extraction. No more intraoral hemorrhage was reported. However, the patient complained of severe spontaneous headache. Computed tomography (CT) of the head was performed and hemorrhage (30×50 mm mass) was observed in his left frontal lobe (Fig. 3A). The patient was admitted immediately to the intensive care unit (ICU) and treated with glycerin for 5 days to prevent expansion of the hemorrhage. Sixteen days after extraction, the treatment for hemorrhage was successful with no evidence of active intracranial hemorrhage observed on magnetic resonance imaging (MRI) (Fig. 3B). No disturbance of consciousness was reported, but movement of the lower limb was restricted. Further, 38 days after tooth extraction, intracranial hemorrhage was spontaneously evoked again by aortic dissection associated with DIC after the patient was discharged from the hospital, resulting in the unfortunate death of the subject (Fig. 4).

3. Discussion

DIC is an acquired bleeding disorder characterized by an imbalance in the hemostatic process, resulting in extensive thrombosis