

## Atypical Ischemic Attack during Dental Treatment of The Elderly Dental Outpatient with Three-vessel Coronary Artery Disease

Tsuneto Ohwatari<sup>1</sup> and Hiroshi Uematsu<sup>2</sup>

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Dentists are confronted with geriatric patients in a daily clinical practice with increase of elderly population in Japan. Although medical emergency in dental care have been mentioned to occur in relatively low frequency<sup>1</sup>, the growing elderly population may provide an increasing risk for dental care due to various systemic diseases, especially cardiovascular diseases. Ischemic heart disease is one of the most popular cardiovascular diseases in the elderly dental outpatients<sup>2</sup>. The elderly with ischemic heart disease is at high risk for ischemic attack, which necessitate emergency medical treatment.

We report the elderly dental outpatient with three-vessel coronary artery disease who developed atypical ischemic heart attack, which was required emergency medical admission, during dental treatment.

### A case report

A 74-yr-old man visited the gerodontic clinic with the chief complaint of denture treatment. Oral examination revealed the need to extract six teeth. At 35 yr of age, he was diagnosed with hypertension. At the age of 47, he was admitted to the hospital with a diagnosis of unstable angina pectoris, hyperlipidemia and glucose intolerance. At 63 yr of age, he was admitted to the hospital urgently with loss of consciousness, and was diagnosed with acute myocardial infarction with frequent ventricular premature beats. Coronary angiography and an intracoronary ergonovine test were performed. The former examination demonstrated triple vessel disease with a severe stenosis of the right coronary artery (#1: 90%, #2: 100%), left main coronary artery (50%), left descending coronary artery (#9: 90%), and circumflex (#11: 74%, #13: 75%) (Figure 1). His aortic pressure, left ventricular pressure and stroke volume index were 174/74mmHg, 172/10mmHg and 86, respectively. Significant defects were seen in territory of the right coronary artery. Electrocardiogram showed ST depression in V4-6. From above results, he was diagnosed with myocardial infarction and unstable angina pectoris from triple vessel disease with moderately impaired left ventricular function. However, coronary artery bypass grafting or percutaneous transluminal coronary angioplasty was not performed because of the difficulty in the identification for main cause of angina pectoris due to diffuse ischemic region in myocardium. He admitted 13 times for the treatment or examination of ischemic heart attack there-

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<sup>1</sup>Lecturer, Gerodontology, Department of Gerodontology, Division of Gerontology and Gerodontology, Graduate School, Tokyo Medical and Dental University

<sup>2</sup>Professor Chairman, Gerodontology, Department of Gerodontology, Division of Gerontology and Gerodontology, Graduate School, Tokyo Medical and Dental University

Address for correspondence : Tsuneto Ohwatari, DDS, PhD. Tokyo Medical and Dental University, 5-45, Yushima, 1-Chome, Bunkyo-Ku, Tokyo, Japan.

Business telephone: (81) 3-5803-5560

Home telephone: (81) 3-5607-2936

Fax: (81) 3-5803-0208

E-mail: t.owatari.gerd@tmd.ac.jp

after.

He has been taking nine drugs: one anti-platelet agent, two calcium channel blockers, one nitroglycerin, one diuretic, one coronary vasodilator, one antiarrhythmic drug, one gout suppressant, and one benzodiazepine. Preoperative electrocardiography showed left ventricular hypertrophy and old inferior myocardial infarction. Chest radiographs revealed a widened cardiac shadow (CTR: 56%) and advanced aortic sclerosis.

Arterial blood pressure and heart rate at first medical examination were 158/74 mm Hg and 56 beats/min respectively. The patient frequently subjected shortness of breath, palpitation, and chest discomfort at slight work in his daily life.

Tooth extractions were carried out three times. Each procedure was scheduled during the period when his anginal attack was absent at least one week. We proposed him tooth extraction under intravenous sedation with midazolam for the purpose of effective stress reduction. In spite of fear to dental care, he rejected intravenous sedation and made a choice of inhalation sedation instead. Therefore, we performed these dental procedures under 30% nitrous oxide inhalation sedation with 3.6~5.4ml 3% prilocaine with 0.03 U/ml felypressin. Monitoring devices such as automated blood pressure recording device, monitor ECG, and pulse oximeter were applied, and intravenous line for the emergency drug administration was provided. As a consequence, there

was no medical complication such as anginal attack except for occasional ventricular premature beats necessitating no medical treatment during dental procedures. He also did not complain significant pain during the treatments.

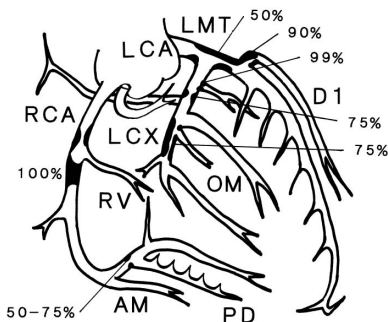
However, on the following dental treatment after a series of tooth extractions, he complained of weakness, dizziness, palpitation, and sweating with slight decrease of blood pressure just after complaint of slight pain during root canal treatment without local anesthesia and sedation. The monitor ECG, however, did not show significant change. The procedure was interrupted immediately and oxygen and sublingual nitroglycerin was administered. We carried him to the cardiology clinic on a charge of atypical ischemic attack. He was diagnosed of anginal attack and was admitted urgently for the further work-up and treatment.

### Discussion

The prevalence of ischemic heart diseases increases substantially with age<sup>3</sup>. Americans with diagnosis of ischemic heart disease in 1996, 57 percent were 65 years or older<sup>4</sup>, and almost 85 percent of death from ischemic heart disease are elderly. The severity and diffuse distribution of the coronary obstruction also increases with age, presumably as a result of prolonged exposure to atherosclerotic risk factors. The impact of risk factors for ischemic heart disease, such as hypertension, diabetes, hyperlipidemia and left ventricular hypertrophy, increases with age. Elderly patients have more multivessel disease and lower cardiac function than do younger patients<sup>5</sup>. Our patient was diagnosed as triple vessel disease with decreased cardiac function and frequently complained of chest discomfort.

Little et al. recommended the following protocols for the pre or intraoperative dental management of the patients with unstable angina pectoris or recent myocardial infarction: continuous monitoring of vital signs including pulse oximeter, intravenous line, prophylactic and supplemental nitroglycerin, inhalation or intravenous

### Coronary arteriogram



Coronary angiography showed severe stenosis in multi vessels.

Figure 1. Coronary arteriogram

sedation, and pain control with local anesthesia; probably best to avoid vasoconstrictors<sup>6</sup>. In the dental management for tooth extractions of our patient, we followed above protocols and there was no medical emergency perioperatively. However, we did not expect strong pain and psychiatric stress for dental care of root canal, therefore we did not use local anesthesia and sedation. Pain, anxiety, and fear reported to activate the sympathoadrenal system and lead to the release of catecholamines in amounts that reduced oxygen delivery become insufficient in relation to myocardial oxygen demand in the patient with advanced coronary atherosclerotic disease<sup>7, 8</sup>. Our patient complained relatively strong pain by dental procedure and might felt anxiety and/or fear. These physical and/or psychiatric stresses might induce ischemic attack.

Ischemic attack of our patient did not accompany typical symptom of ischemic attack such as chest discomfort. We wondered if his symptoms were due to anginal attack or not at first. Although angina is a common first presentation of ischemic heart disease, that frequently do not occur in the elderly. The presence of significant ischemic heart disease without typical symptoms increases with age. Because only about 20 percent of people older than 80 have clinically evident ischemic heart disease<sup>9</sup> and over 50 percent have significant ischemic heart disease at autopsy<sup>10</sup>, a large number of elderly people must have significant ischemic heart disease without symptoms. For this reason, almost 30 percent of ischemic heart diseases in the elderly are silent ischemia<sup>11</sup>. The reason for increased silent ischemia in the elderly patient is not known, but it may be related to mental status changes impairing perception or recall of ischemic pain, to the development of collaterals that reduce the severity of the myocardial ischemia, to autonomic dysfunction, or to increased sensitivity to endogenous endomorphins<sup>12</sup>.

An electrocardiogram taken during chest discomfort usually shows definite ST segment elevation or depression, or marked T wave inversion. However, our patient

did not show these changes. Because almost all his myocardium was ischemic state due to three vessel disease, potential might be counteracted and typical ECG changes might not be appeared.

We conclude that the relief of anxiety and fear for dental treatment and the effective control of pain must be essential in order to prevent ischemic attacks in elderly dental outpatients with severe ischemic heart disease, even if the treatment is suspected to be accompanied by relatively low physical and/or psychiatric stress.

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## 歯科治療中に非定型的な心筋虚血発作を起こした 冠状動脈3枝の高度狭窄を伴う高齢歯科患者の一例

大 渡 凡 人, 植 松 宏

(東京医科歯科大学大学院医歯学総合研究科 老化制御学系 口腔老化制御学講座 口腔老化制御学分野)

高齢者人口の増加により、重篤な循環器疾患を有する高齢者の歯科受診が増えている。我々は重篤な虚血性心疾患である3枝病変を合併する高齢者の歯科治療において典型的症状を伴わない心筋虚血発作を経験した。

患者は74歳の男性で義歯作成を前提に、多数歯抜歯および根管治療を含む修復処置を予定した。病歴は#1. 3枝病変による不安定狭心症および心筋梗塞、#2. 高血圧症、#3. 高脂血症、#4. 耐糖能異常であり、特に#1では13回入院を繰り返している。

歯科治療は1週間以上発作の無い時期を選んで行った。抜歯では循環系モニターおよび笑気吸入鎮静法下に、循環系作動薬投与のための静脈路を確保した上で0.03IU/ml felypressin 含有3% propitocaineを用いて行った。一連の抜歯は何らの異常なく終了した。しかし、引き続いて行った根管処置では、強い疼痛を予測しなかったため、モニター以外の対策を行わなかった。患者は治療による疼痛を自覚後に、めまい、動悸および冷汗を訴えた。胸部痛は伴わなかったが、典型的症状を伴わない心筋虚血発作を疑い循環器内科に搬送したところ、心筋虚血発作として即日入院となった。

高齢者では典型的症状を伴わない心筋虚血発作が多く、十分な注意が必要である。また、重篤な虚血性心疾患では特に嚴重な疼痛対策や精神的ストレスの緩和が必要である。