

Atypical Presentation of Myocardial Ischaemia as Referred Pain to Jaw in a Young Adult-A Case Report

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Authors' contributions

This work was carried out in collaboration between both all authors. Both authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Ischaemic Heart Disease (IHD) accounts for the highest mortality rate among the non-communicable diseases across the globe. In the developed countries the incidence of IHD has shown a slow decline over the past two decades. It is traditionally considered as a disease of the elderly though clinicians and pathologists experience more and more younger individuals getting affected by the condition since last few decades due to a variety of reasons. IHD has a variety of presentations some of which could lead to diagnostic difficulties unless due caution is exercised. Isolated referred pain to teeth, jaw or craniofacial region is one such rare presentation for which many theories have been put forward to explain the mechanism though none is conclusive. When a patient complains of an unusual pain in the craniofacial region or the jaw, the remote possibility of its cardiac origin should always be born in mind. Otherwise it could not only lead to unnecessary dental interventions but also it could unduly delay the diagnosis and treatment of a more serious health condition sometimes leading to severe morbidity or even death. This case illustrates a situation where a young male suffering from intermittent tooth pain/jaw pain for over a period of three months, seeking dental treatment including extractions and restorations from a qualified dental surgeon, suddenly collapsed and died at workplace after complaining of excruciating tooth-pain. The cause of death was established after meticulous post mortem examination as IHD due to coronary thrombosis.

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1. INTRODUCTION

IHD is a major health issue worldwide causing high level of mortality and morbidity. Isolated pain over the craniofacial region or teeth due to IHD is a relatively uncommon manifestation. We illustrate the post mortem findings of a death following IHD due to coronary thrombosis in an otherwise healthy young male who only complained of an on-and-off jaw pain for over a period of three months.

2. CASE REPORT

A post mortem examination of a 30-year old male-a carpenter by profession-was authorized by the inquirer into sudden deaths. The history revealed only a tooth pain of lower jaw over the last three months for which he has consulted a specialist dental and maxillofacial surgeon. Two teeth were subjected to nerve-filling and one was extracted. Meanwhile he engaged himself with his routine work and he had never complained of chest pain even with exertion. His past medical history and family history were unremarkable. He was a non-smoker and consumed alcohol in moderate amounts for the last ten years. On the date of his death he had gone for his routine work and had his breakfast at the work place with his friends. After being heavily engaged with his manual work as a carpenter for few hours, he had a short break where he had consumed few

slices of bread and curry with his friends around 11.30 am. Immediately after the meal he felt a severe tooth-pain in the lower-jaw which was not an unusual experience for him over the last few months despite dental consultations and treatment. One of his work-mates bought a “pain-killer” tablet for him but his pain did not seem to answer. His work-mates saw him gripping his lower jaw in unbearable pain. At one point he stood up and then suddenly collapsed on the ground and became motionless. He was immediately rushed to a nearby private hospital where it was advised to take him to the nearest tertiary care hospital. After initial resuscitation for a few minutes at the emergency treatment unit, he was pronounced to be dead.

At the autopsy, the body was found to be that of a well-built male, height being 168 cm and weight being 70 kg. The estimated BMI was 24.8. No evidence of hyperlipidaemia such as arcus lipidis, xanthalesma was seen. Neck, eyes, mouth, other natural orifices and the rest of the body were devoid of fresh or old injuries. His oral hygiene was satisfactory. Recent dental restorations and extractions were evident. Routine and special dissection techniques were employed. Blood, urine and stomach contents were sent to the government analyst for toxicological analysis. Routine samples were taken for histopathology.

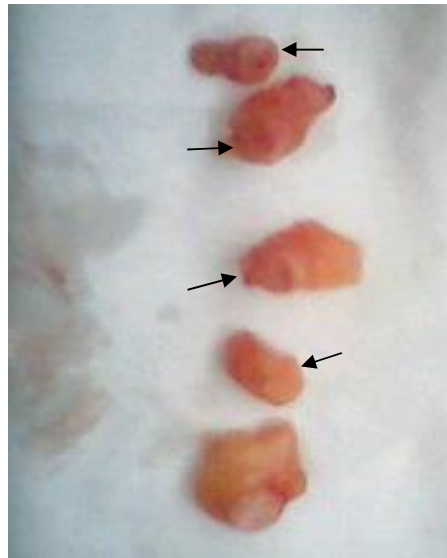


Fig. 1. Sections of right coronary artery showing thrombosis

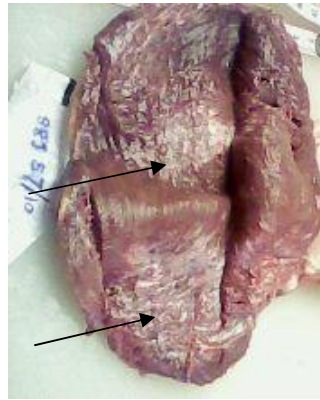


Fig. 2. Areas of myocardial fibrosis of the lateral wall of the left ventricle

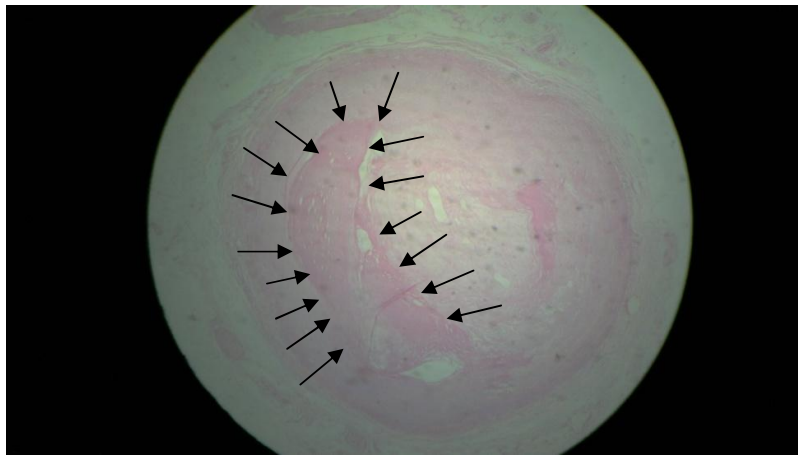


Fig. 3. Atheromatous narrowing of the lumen of the right coronary artery with thrombus formation and recanalization. (arrows show the thrombus)

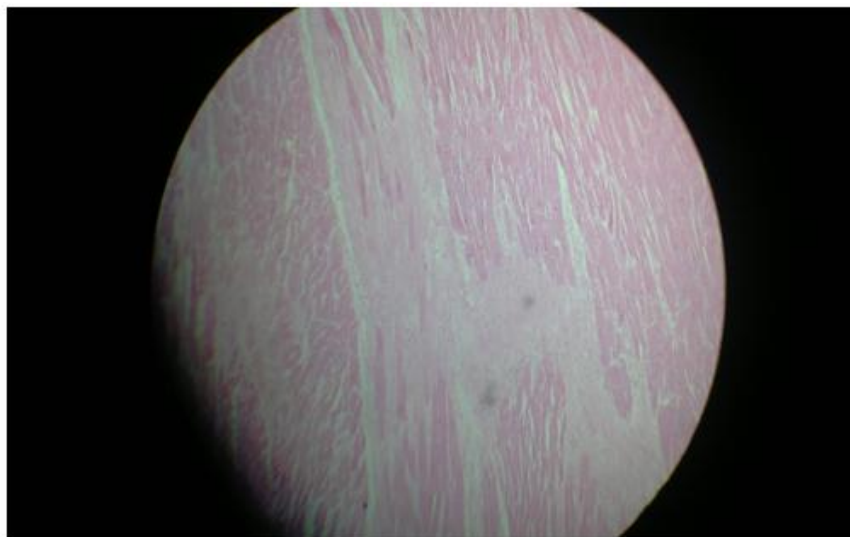


Fig. 4. Myocardial fibrosis under H&E staining

The heart weighed 400 g. The anterior descending branch of the left coronary artery showed approximately 50% eccentric narrowing of the lumen along the first few centimeters from its origin due to atheroma. The right coronary artery showed mild to moderate atheromatous narrowing (approximately 30%) up to the right border of the heart. A thrombus was found completely obstructing the lumen of the right coronary artery at a site around one centimeter from its origin. The circumflex branch of the left coronary artery appeared nearly normal. The left ventricular thickness was 12mm. Sectioning of the myocardium showed patchy areas of fibrosis on the septum and lateral wall of the left ventricle. No macroscopic evidence of an acute myocardial infarction was noted. The valves, chordate tendinae and the papillary muscles were normal. Histology (H&E staining) confirmed the above findings.

The cause of death was issued according to the WHO format:

- 1a. IHD
- 1b. Coronary thrombosis
- 1c. Atherosclerosis

3. DISCUSSION

The total number of deaths in the world in the year 2019 was reported as 55.4 million. 74% out of that, which comes as 40 million was due to non-communicable diseases. 15 million (27%) were due to cardiovascular causes [1]. 8.9 million deaths were due to ischaemic events. It was clearly evident that in the so-called high-income countries, cardio-vascular mortality has declined substantially over the past two decades because of well planned primary prevention and individual health care intervention strategies. In contrast to this, there has been a doubling of the cardiovascular deaths in the low and mid income countries during the past few decades [1,2]. This is equally applicable to Sri Lanka where cardiovascular deaths are on a steady rise.

Referred pain could be defined as pain felt in an anatomical region other than where the cause producing that pain is situated [3]. Referred pain over cranio-facial and lower jaw region due to acute myocardial ischaemia has been recognized as a well-established but rare form of presenting complaint [4]. Yet, according some other studies, in about one fifth of cases pain could be localized in the region of the lower jaw and teeth [5].

Several research papers confirm similar clinical manifestations and scenarios. Natkin et al have published a case where anginal pain was referred to the left posterior teeth [6]. M S Maston reported a case of coronary artery thrombosis where the patient had experienced pain in both sides of mandible and neck and it had radiated to the lateral aspects of zygoma and temporal areas. The highlighting feature of this case is that the patient had specifically denied having any form of chest, shoulder or arm pain [7]. Mandibular pain due to coronary insufficiency as the sole clinical manifestation was reported by Batchelder and her colleagues [8]. Shehryar N Khawaja also discusses a case of left posterior mandibular pain as the sole presentation of a cardiovascular disease [9]. Mahin Bakshi and colleagues have done a study on frequency of craniofacial pain in patients with ischaemic heart disease [10]. Prompt diagnosis is needed to reduce mortality and morbidity which is a challenge to dental surgeons as well as physicians [11,12]. There is a reported case on orofacial pain suspected to be of cardiac in origin by a vigilant maxillofacial surgeon which was later diagnosed to have been due to vasospastic angina [13].

Since the tooth pain or craniofacial pain due to acute coronary insufficiency is a well-established entity, there should be an explanation for this as well. Yet, a thorough literature review reveals that it is still obscure and an undoubted explanation or an unsettled proposition is not yet put forth though multiple postulated theories are available. Neuroanatomically, it is an established fact that nerve fibers from regions of high sensory input (such as skin) and nerve fibers from regions of relatively low sensory input (such as internal organs) happen to converge at the same levels of the spinal cord. Nerve fibers from hypoxic or ischaemic myocardium of the heart carry pain signals to the spinal cord levels T1- T4 on the left side of the chest and part of the left arm. Because of the difference in intensity of impulse, the brain tends to interpret them as those in the chest and left arm. Electrical stimulation of cardiac branch of the left vagus nerve in humans can cause referred craniofacial pain, assuming that the vagus plays a role in mediating this pain [14]. A gender difference has also been postulated among those who experience craniofacial referred pain due to coronary ischaemia [15]. Cranio-facial pain misleading the clinicians to arrive at a wrong diagnosis and inappropriate and insufficient

therapeutic interventions has been reported in several occasions [16,17].

A high degree of suspicion towards the cause and origins of inexplicable and unusual cranio-facial and jaw pain not responding to usual dental interventions leads to proper diagnosis thus providing the patient with better chance of survival with less morbidity. In this particular case, the deceased was only 30 years old and his sole complaint was an unusual tooth pain lasting over three months and not responding to restorations and extractions.

4. CONCLUSION

IHD manifesting solely as referred pain to cranio-facial region is a rare occurrence. An awareness of this presentation and a high degree of clinical suspicion both by the medical doctors as well as dental practitioners could lead to timely diagnosis of the correct underlying cardio-vascular pathology thus enabling the accurate therapeutic management of the condition.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. WHO | The top 10 causes of death; 2020.
Available: <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>
2. Mendis S, Puska P, Norrving B. Global atlas on cardio vascular disease and prevention and control. World Health Organization. 2011;5(8):10,24
3. Medical dictionary.

- Available: <http://www.medterms.com/script/main/art.asp?articlekey=34151>
4. Tzukert A, Hasin Y, Sharav Y. Orofacial pain of cardiac origin. *Oral Surg Oral Med Oral Pathol.* 1981;51(5):484-6.
 5. Edmonstone WM. Cardiac chest pain: Does body language help the diagnosis? *Br Med J.* 1995;311:23-30.
 6. Natkin E, Harrington GW, Mandel MA. Anginal pain referred to the teeth. *Oral Surg Oral Med Oral Pathol.* 1975;40(5):678-80.
 7. Matson MS. Pain in orofacial region associated with coronary insufficiency. *Oral Surg Oral Med Oral Pathol.* 1963;16(3):284-5.
 8. Batchelder BJ, Krutchkoff DJ, Amara J. Mandibular pain as the initial and sole clinical manifestation of coronary insufficiency: Report of case. *J Am Dent Assoc.* 1987;115(5):710-2.
 9. Khawaja SN, Scrivani SJ, Keith DA. Facial pain associated with cardiac origin. *J Am Dent Assoc.* 2018;149(3):220-5.
 10. Bakhshi M, Rezaei R, Baharvand M, Bakhtiari S. Frequency of craniofacial pain in patients with ischemic heart disease. *J Clin Exp Dent.* 2017;9(1):e91-5.
 11. Myers DE. Toothache referred from heart disease and lung cancer via the vagus nerve. *Gen Dent.* 2010;58(1):e2-5.
 12. Kreiner M, Okeson J, Tanco V, Waldenström A, Isberg A. Orofacial pain and toothache as the sole symptom of an acute myocardial infarction entails a major risk of misdiagnosis and death. *J Oral Facial Pain Headache.* 2020 Winter;34(1):53-60.
 13. Adachi M, Hayashi M, Segawa T, Yamaki T, Muramatsu Y, Sumitomo S. Orofacial pain associated with vasospastic angina: A case report. *J Oral Facial Pain Headache.* 2017 Autumn;31(4):e1-e3.
 14. *British Dental Journal.* 2008;204:187-189.
Published online: 23 February 2008
DOI: 10.1038/bdj.2008.101
 15. Available: <http://www.practicalpainmanagement.com/pain/maxillofacial/craniofacial-pain-cardiac-origin>

16. Kreiner M, Okeson JP. Toothache of cardiac origin. J Orofac Pain. 1999;13(3):201-7.
17. Biagini A, Emdin M, Mazzei MG, et al. Clinical characteristics of anginal pain in man. Funct Neurol. 1989;4(1): 43-45.

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