SPECIAL COMMUNICATION

Dental care of patients scheduled for cardiovascular surgery: Which protocols should be followed?

Farhan Raza Khan, Humayun Kaleem Siddiqui, Muhammad Tariq

Abstract

Dental extraction of abscessed or infected teeth before cardiac operation is frequently advocated to lower the risk of infections, especially infective endocarditis. The scientific evidence that supports dental procedures before cardio-valvular surgery is, however, limited. The aim of the present paper was to explore whether there are any protocols for patients needing dental treatment before cardiac surgery. Moreover, we have discussed the real life challenges encountered in the management of such patients.

Keyword: Extractions; Cardiac surgery; Infective endocarditis

DOI: https://doi.org/10.47391/JPMA.035

Introduction

The presence of chronic oral infection such as apical periodontitis is considered an independent risk factor for the onset of cardiovascular disease (CVD), and an increasing number of studies are associating apical periodontitis (endodontic infection) with the risk of CVD.[1,2]

The US Surgeon General has addressed the significance and association of oral health with systemic health; the World Health Organisation (WHO) has supported the relationship between oral and general health; and the European Union (EU) has developed programmes and policies for chronic diseases, including common oral diseases.[3,4]

One of the important controversial issues in the relationship between oral health and CVD is how to screen for and manage oral infections prior to cardiothoracic, vascular surgery and / or other invasive cardiovascular (CV) procedures. To date, international guidelines have provided incomplete and inconsistent information on relevant issues such as (a) need of dental evaluation before surgery, (b) treatment that should be performed before the patient undergoes cardio-valvular surgery; and risks vs benefits associated with dental treatment before CV procedures.

In a tertiary care hospital, a considerable number of patients are being referred to dental clinics for examination and treatment before invasive CV surgeries. It's known that the dissemination of bacteria from oral cavity to other sites, especially cardiac valves, has been associated with infective endocarditis.[5,6]

Infective Endocarditis (IE) is a severe infection that affects the endocardial surfaces.[7] IE occurs more frequently around acquired or congenital heart defects.[8] The pathogenesis of IE involves bacteraemia, either from an infected endodontic or periodontal sites,[9,10] or from intervention of infected dental or periodontal tissues.[11,12] Benign procedures, such as tooth brushing and flossing, have also shown to cause bacteraemia with the potential to cause IE.[13,14]

In this context, a recent systematic review,[15] that is based on the data derived from 44 primary studies, has addressed the following questions: Is dental evaluation mandatory before cardiovascular surgery? Are there any established protocols for that? Lastly, is dental treatment effective, if done prior to cardiac surgery? The present paper will discuss the findings synthesised from this systematic review and discuss the real life challenges related to these questions.

1- Is dental evaluation mandatory before cardiovascular surgery?

It is known that patients who need cardiac surgery (especially in a developing country such as Pakistan) present with chronic periodontitis, apical pathosis or infected pulps, all of which are precursors of infection. A study conducted on nearly 600,000 patients scheduled for heart valve surgery, clearly suggested that the presence of gum infection is associated with substantially high chances of infection, longer hospital stay and higher treatment cost.[16]

It was alarming to note that only 45% cardiologists recommended a dental check-up for paediatric patients scheduled for cardiac surgery or catheterisation.[17] In this context, dental examination should be considered essential before cardiac valve surgery, aortic surgery,

Department of Surgery, Aga Khan University, Karachi, Pakistan.
Correspondence: Farhan Raza Khan. Email: farhan.raza@aku.edu

coronary stents and other invasive cardiovascular procedures.

Real life challenges: Not all cardiothoracic/vascular surgeons are sensitised regarding dental evaluation. The surgeons need to be updated on the relationship between dental and cardiac problems for the prevention of IE. In addition to the surgeon, the anaesthesiologist at the pre-anaesthesia clinic can also route the patients to mandatory dental visit.[18]

2. Are there any established protocols for dental care prior to cardiac surgery?

Ideally, a dentist must carry out a comprehensive clinical visual examination,[19,20] with palpation of intra and extra-oral tissues, assessment of oral hygiene, periodontal evaluation with recording of probing depths around the teeth, exploration of individual teeth, documenting decayed, missing, filled teeth (DMFT) with vitality tests of any questionable teeth. Additionally, exploration of the integrity of existing dental restorations and prosthesis along with radiographic examination (using panoramic or intraoral radiographic series) should be done.

Dental treatments should be categorised into three categories: (a) treatments that must be performed before a major cardiac surgery, which include extraction of infected/mobile teeth, and large dental restorations encroaching the pulp; (b) treatments that should ideally be performed before cardiac surgery (such as scaling for progressive marginal gingivitis); and (c) dental treatments that should either be deferred or can easily be completed after the cardiac surgery (fixed or removable prosthodontics). Dental treatment should be performed a week or two before cardiac surgery to allow adequate healing time. The dental team should offer antibiotic prophylaxes, too, where needed. In case the patient is on Warfarin or any other circulating anti-coagulant, an INR (International Normalised Ratio) test must also be done.

Real life challenges: Cardiac patients usually present late to the surgeons. The cardiologist/cardiac surgeons usually don't give enough time to the dentists to carry out proper dental treatment. Scheduling a patient for major cardiac surgery where the oral wounds are not healed properly (or the periodontal tissues and apical lesions are still infected) actually defeats the philosophy of the entire exercise. Cardiologists/cardiac surgeons should give enough time to the dental team to optimise the oral health of the cardiac patient and should avoid pressing on the dentists for their procedures. If the cardiac surgery cannot be delayed, then consultation with the dental team should be carried out to plan the concomitant operation where the dentist treats the teeth and cardiac team operates on the heart in the same general anaesthesia. Obviously, this cannot be done in all patients but evidence suggests that it's certainly both doable and predictable.[21] Among all dentists, oral surgeons are the most suitable specialists to manage oral problems of medically compromised patients. This includes patients with cardiac problems.

3. Are dental treatments effective, if done prior to cardiac surgery?

Despite all the evidence, dental treatment prior to cardiac surgery remains a controversial topic. An international conference involving more than 1,000 physicians from 77 countries, labelled only 14 perioperative interventions as effective in reducing mortality.[22] Chlorhexidine (CHX) mouthwash was one of these interventions.[22]

The question whether dental treatment is worthy of actually reducing complications among patients scheduled for cardio-valvular surgery, is still very much there. The most interesting study to support this argument was the one[23] in which nearly 100 cardiac patients were divided into three study groups: Group I comprised dentally unhealthy cardiac patients who were not dentally treated; Group II consisted of dentally healthy patients who were not given any dental treatment; whereas Group III comprised dentally unhealthy patients who were provided with treatment. The results showed that the Group III patients were not at higher risk for developing IE. Similarly, they did not exhibit any greater mortality compared to Group I or Group II. These results clearly show that treatment of oral infections prior to cardio-valvular operations are not warranted.[23]

Real life challenge: Pre-operative dental procedures for patients undergoing cardiothoracic surgery remains a controversial issue as the evidence in favour of dental treatment is weak.

Conclusion

Although detailed guidelines are yet to be formulated, this paper suggests that dental treatment before cardiovascular surgery must be customised to the patient's individual dental needs.

Disclosure: There is no conflict of interest regarding publication of this paper.

Contribution: All authors have contributed significantly. FRK conceived the idea and drafted the manuscript. HKS contributed in the write-up and did literature review. MTK reviewed and approved the final manuscript.

Conflict of Interest: None

Funding Sources: None

References

1. Pussinen PJ, Kononen E. Oral health: A modifiable risk factor for cardiovascular diseases or a confounded association? Eur J Prev Cardiol. 2016; 23:834-38.
2. Cotti E, Mercuro G. Apical periodontitis and cardiovascular diseases: Previous findings and ongoing research. Int Edod J. 2015; 48: 926-32.
3. World Health Organisation, 69th World Health Assembly [Online] 2016 [Cited 2019 August 11]. Available from: URL: http://www.who.int/mediacentre/news/ releases/2016/wha69-27-may-2016/en/
4. Council of the European Union. Council conclusions. Innovative approaches for chronic diseases in public health and healthcare systems [Online] 2010 [Cited 2020 November 21]. Available from: URL: http://www.idf.org/sites/default/files/Council_conclusions_7%20Dec%202010_Chronic%20Disease.pdf
5. Nishimura RA. ACC/AHA 2008 guideline update on valvular heart disease: focused update on infective endocarditis: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2008; 52:676-85.
6. Thuny F, Grisoli D, Collart F, Habib G, Raoult D. Management of infective endocarditis: challenges and perspectives. Lancet. 2012; 379:965-75.
7. Werdan K. Mechanisms of infective endocarditis: pathogen–host interaction and risk states. Nat Rev Cardiol. 2014; 11:35-50.
8. Wilson W. Prevention of infective endocarditis. Circulation. 2007; 9:1736-54.
9. Cornelissen CG, Frechen DA, Schreiner K, Marx N, Krüger S. Inflammatory parameters and prediction of prognosis in infective endocarditis. BMC Infect Dis. 2013; 13:272.
10. Terezhalmy G, Safadi TJ, Longworth DL, Muehrcke DD. Oral disease burden in patients undergoing prosthetic heart valve implantation. Ann Thorac Surg. 1997; 63:402-4.
11. Parahitiyawa NB. Microbiology of odontogenic bacteraemia: beyond endocarditis. Clin Microbiol Rev. 2009; 22:46-64.
12. Tomás I, Diz P, Tobías A, Scully C, Donos N. Periodontal health status and bacteraemia from daily oral activities: systematic review/meta-analysis. J Clin Periodontol. 2012; 39:213-28.
13. Horliana AC, Chambrone L, Foz AM, Artese HP, Mde RS, Pannuti CM, et al. Dissemination of periodontal pathogens in the bloodstream after periodontal procedures: a systematic review. PLoS One. 2014; 9:e98271.
14. Lockhart PB, Brennan MT, Sasser HC, Fox PC, Paster PJ, Bahrani-Mougeot FK. Bacteraemia associated with tooth brushing and dental extraction. Circulation. 2008; 117:3118-25.
15. Cotti E, Arrica M, Di Lenarda A, Serri SB, Bassareo P, Padeletti L, et al. The perioperative dental screening and management of patients undergoing cardiothoracic, vascular surgery and other cardiovascular invasive procedures: A systematic review. Eur J Prev Cardiol. 2017; 24:409-25.
16. Allareddy V, Elangovan S, RampaS, Shin K, Nalliah RP, Allareddy V. Presence of gingivitis and periodontitis significantly increases hospital charges in patients undergoing heart valve surgery. J Mass Dent Soc. 2015; 63:10-6.
17. Coutinho A, Maia L, Castro G. Knowledge and practices of paediatric cardiologists concerning the prevention of infective endocarditis of oral origin. Gen Dent. 2007; 56:29-34.
18. Flynn B, Silvay G. Value of specialized pre-anaesthetic clinic for cardiac and major vascular surgery patients. Mt Sinai J Med. 2012; 79: 13-24.
19. Yasny JS, Silvay G. The value of optimising dentition before cardiac surgery. J Cardiothorac Vasc Anesth. 2007; 21:587-91.
20. Yasny JS, White J. Dental considerations for cardiac surgery. J Card Surg. 2009; 24: 64-8.
21. Lockhart PB, Brennan MT, Cook WH, Sasser H, Lovell RD, Skipper ER, et al. Concomitant surgical treatment of dental and valvular heart diseases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009; 107:71-6.
22. Landoni G, Rodseth RN, Santini F, Ponschab M, Ruggeri L, Székely A, et al. Randomized evidence for reduction of perioperative mortality. J Cardiothorac Vasc Anesth. 2012; 26: 764-72.
23. Wu GH, Manzon S, Badovinac R, Sook-Bin Woo. Oral health, dental treatment, and cardiac valve surgery outcomes. Spec Care Dentist. 2008; 28: 65-72.