http://dx.doi.org/10.1590/1981-86372022000420200049

Dental care of hospitalized pediatric patient with tetralogy of Fallot: a case report

Atendimento odontológico hospitalar de paciente pediátrico com tetralogia de Fallot: relato de caso

Claudia Lobelli **CHANDLER**[1] 0000-0002-0087-6868

Manoelito Ferreira **SILVA-JUNIOR**[2] 0000-0001-8837-5912

ABSTRACT

Tetralogy of Fallot is the most prevalent cyanotic congenital heart disease and it has a high mortality rate. The aim of this article was to provide a clinical case, describing the dental treatment of an infant patient with tetralogy of Fallot done at a hospital. The patient was a 7-year-old male, lived in a rural area with no previous diagnosis of this cardiopathy when he was attended to by a multidisciplinary team at University Hospital Ana Bezerra, at Santa Cruz, Northern Rio Grande, Brazil. After his medical appointment, the patient received a visit from the dental resident in Mother-Infant Health in his hospital room. During the dental exam, multiple carious lesions were found and there was an urgent need to reduce the risk of dental infection before the patient underwent heart surgery. The treatment started with a preventive approach, including oral hygiene instruction and behavior management. The treatment was completed using the atraumatic restorative technique, and a root tip was extracted. Antibiotic prophylaxis was administered before the extraction to minimize the risk of infectious endocarditis. After the dental treatment, the multidisciplinary team referred the patient for surgery to address the tetralogy of Fallot. The integration between the multidisciplinary residency and the medical team was important to reduce the risks of infectious endocarditis during the dental treatment, aiming to provide integral care to this patient.

Indexing terms: Congenital heart disease. Hospital dental team. Pediatric Dentistry. Tetralogy of Fallot.

RESUMO

A tetralogia de Fallot é a cardiopatia cianótica congênita mais prevalente, e apresenta alta mortalidade. O objetivo do presente artigo foi descrever um caso clínico de atendimento odontológico de paciente infantil com tetralogia de Fallot em ambiente hospitalar. O paciente de 7 anos de idade, sexo masculino, morador da zona rural, não possuía o diagnóstico da cardiopatia quando buscou o serviço e foi atendido pela equipe multidisciplinar do Hospital Universitário Ana Bezerra, em Santa Cruz, Rio Grande do Norte, Brasil. O paciente, após atendimento médico, recebeu no leito da enfermaria do hospital a visita do cirurgião-dentista residente na Residência Multiprofissional em Saúde Materno-Infantil. Após avaliação bucal, verificou-se múltiplas lesões de cárie, e necessidade de tratamento odontológico urgente para redução de risco do foco infeccioso, previamente ao procedimento cirúrgico da cardiopatia. O tratamento iniciou pela abordagem preventiva, com orientações de higiene oral e condicionamento psicológico, e em seguida foi feito tratamento restaurador, pela técnica restauradora atraumática e extração de um fragmento radicular. A profilaxia antibiótica foi realizada antes da extração, para minimizar o risco de endocardite bacteriana. Após o atendimento odontológico, o paciente foi encaminhado pela

[1] Temple University Hospital. Pediatric Dentistry Program, 2301 East Allegheny Ave, Philadelphia, Pennsylvania, 19134, United States of America. Correspondence to: CL Chandler. E-mail: <claudialobelli@gmail.com>.

[2] Universidade Estadual de Ponta Grossa, Departamento de Odontologia. Ponta Grossa, PR, Brasil.

How to cite this article

Chandler CL, Silva-Junior MF. Dental care of hospitalized pediatric patient with tetralogy of Fallot: a case report. RGO, Rev Gaúch Odontol. 2022;70:e20220004. http://dx.doi.org/10.1590/1981-86372022000420200049

equipe multidisciplinar para a abordagem cirúrgica da tetralogia de Fallot. A integração da residência multiprofissional com a equipe médica foi importante para a redução de riscos de endocardite bacteriana durante os procedimentos odontológicos, visando uma atenção integral ao paciente.

Termos de indexação: *Cardiopatias congênitas. Equipe hospitalar de Odontologia. Odontopediatria. Tetralogia de Fallot.*

INTRODUCTION

Tetralogy of Fallot is the most common cyanotic congenital heart condition. Its prevalence in children is about 2 per 10,000 and it represents 10% of all coronary heart diseases [1,2]. Tetralogy of Fallot has four main characteristics: ventricular septal defect, pulmonary valve stenosis, a misplaced aorta and a thickened right ventricular wall [2-5].

The anatomical defects decrease the amount of oxygen in the blood, leading to cyanosis, polycythemia and hypoxia [2]. Heart surgery can normalize the cardiovascular physiology and decrease the secondary effects on the body [6]. Surgeries performed on infants between 3-11 months of age, result in a survival rate of 86% at age 36. For non-surgical treatment, the mortality rate is 30% for children that are 2 years old and 50% for children that are 6 years old [7].

The most frequent intraoral findings in children with tetralogy of Fallot are cyanosis in the mucosa, tongue and gingiva, along with stomatitis, delayed tooth eruption, agenesis, enamel hypoplasia and increased caries risk [2,8-10]. The dental management of the patient varies according to their age and their overall health.

There aren't many published cases about dental treatment of patients diagnosed with tetralogy of Fallot [2,9-12]. The goal of this article is to provide guidance for clinicians by describing the dental treatment of a pediatric patient with tetralogy of Fallot performed in a hospital setting.

CASE REPORT

Patient was 7 years old, male, white and came with his parents to the pediatric emergency department of Ana Bezerra University Hospital in Santa Cruz (North Rio Grande), Brazil. The patient lived in a rural area that didn't have dental services nearby. The patient came to the hospital with labored breathing, productive cough, fever and cyanosis in

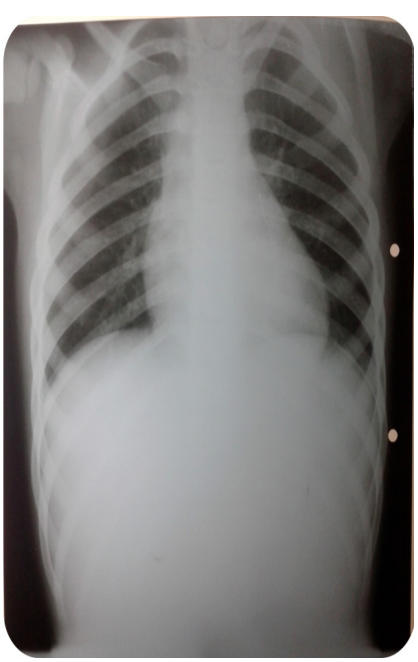

Figure 1. Thoracic radiograph.

his extremities. His parents reported that their child had had trouble breathing in the past, but due to the difficult access to medical care they treated the child with palliative care at home. During the clinical exam, the doctors discovered the presence of a ventricular murmur, a holosystolic murmur and digital clubbing. The doctors suspected that the child could have a cardiac condition, so they ordered a thoracic radiograph (figure 1) and an electrocardiogram. The result of these tests and the information gathered during the clinical exam lead the medical team to come up with the diagnosis of tetralogy of Fallot. The parents were informed about the diagnosis and that the child would need to undergo surgery.

Because Ana Bezerra University Hospital was not equipped to provide adequate care for this condition, the patient was referred to another hospital for his cardiac surgery. The medical team recommended inpatient monitoring and preparation at Ana Bezerra University Hospital until the transfer occurred.

A dental resident from a multi-professional residency in mother and infant care visited the patient in the hospital and learned that he had never had a dental visit before. His parents stated how difficult it was for them to have access to medical and dental care because of their socioeconomic situation which limited their access to transportation to the nearby hospitals and clinics. During this patient's first dental appointment, the dental resident did a clinical and radiographic exam, gave oral hygiene instructions and helped the child feel comfortable by utilizing techniques like "tell-show-do" [13] (figure 2). The child showed positive and receptive behavior during the visit and, at the end, received a bag with a toothbrush, toothpaste and floss. During the dental exam, the resident found heavy dental plaque and generalized gingivitis. Additionally, there were decalcified white spot lesions in the majority of the cervical areas of his teeth and cavitated carious lesions in multiple teeth, especially his primary molars. His first permanent molars were in occlusion and non-carious. Furthermore, a draining fistula, associated with an underlying dental abscess, was discovered on the buccal surface of the lower right primary second molar.

The oral infection and the generalized gingival inflammation that the patient had could cause life threatening complications during the cardiac surgery. Since the patient was being closely monitored in his hospital bed, the dental team decided that the best and safest option was to make adaptations and provide the dental treatment while in the hospital bed.

Figure 2. Patient's first dental visit, done by a dental resident and performed bedside.

During the first dental visit, nine primary tooth dental restorations were performed utilizing the atraumatic restorative technique (ART): upper right canine and first and second molars, upper left canine and second molar, lower left first and second molars, lower right canine and first molar. The caries were removed with a spoon excavator and the teeth were rinsed using a disposable plastic syringe with saline. The teeth were filled with a glass ionomer restorative material according to the manufacturer's instructions (Vidrion® R, SS White Artigos Dentários Ltda., São Cristovão, RJ, Brasil) and covered with fluoride varnish (Fluorniz®, SS White Ltda., Artigos Dentários Ltda São Cristovão, RJ, Brasil) (figure 3A-C).

Figure 3. A) Atraumatic restorative technique (ART) done on the upper left primary second molar. The carious tissue being removed with a spoon excavator; B) Tooth rinsed with a disposable plastic syringe and saline; C) Filling done using glass ionomer restorative material.

The following day, a periapical radiograph of the lower right primary second molar was taken (figure 4) and it was extracted. One hour before the surgery, the patient received a prophylactic dose of Amoxicillin (250mg/5mL) according to his weight. During the procedure, supplemental oxygen was available in case the patient had any trouble breathing. For the local anesthesia, topical Benzocaine 200mg/g (Benzotop®, DFL Industria e Comércio S/A, Rio de Janeiro, RJ, Brasil) was used and a right inferior alveolar nerve block was performed using one carpule of mepivacaine hydrochloride 3% without vasoconstrictor (MEPISV®, DFL Industria e Comércio S/A, Rio de Janeiro, RJ, Brasil). After the surgery, post-operative instructions were given to the parents.

Figure 4. Periapical radiograph of a root tip of the lower right primary second molar.

The dental resident provided follow-up care after the dental surgery, visiting the patient each day to evaluate the healing process and reinforce oral hygiene instructions. After seven days, the surgical site had healed, the gingivitis had improved and the accumulation of dental plaque had decreased considerably. The patient was discharged from Ana Bezerra University Hospital and sent to the other hospital to undergo his heart surgery. The follow up after the heart surgery was to be provided by the multidisciplinary team back at Ana Bezerra University Hospital.

During the treatment, the patient received respiratory physical therapy from the physical therapy residents. Moreover, all the drugs dispensed to the patient were closely monitored by the pharmacy resident. The resident nurses were fundamental in caring for the patient and helping to organize the area for the dental resident to deliver dental treatment in the patient's hospital bed. Social worker and psychology residents worked closely with the patient's family to integrate them into the hospital's routine, guarantee their comfort and integral access to the medical treatment that the patient needed. The multidisciplinary team worked together to facilitate the referral of this patient to the hospital where he had the heart surgery and arrange for the future follow-up care.

DISCUSSION

The clinical case presented in this article is a rare example of a seven-year-old child with tetralogy of Fallot who had survived without diagnosis or cardiac surgery. The lack of appropriate diagnosis and treatment leads to high mortality rates during childhood. Only 2% of untreated patients survive beyond four years of age and they rarely survive past the age of seven [14]. Therefore, when heart surgery is indicated, it should be performed as early \as possible [3,7]. Consistent with the case presented, tetralogy of Fallot is more prevalent in males [8,12].

Studies have shown that patients with congenital cardiac disease have higher rates of poor oral hygiene. They also have higher rates of decayed, missing or filled teeth, along with a higher number of teeth in need of endodontic therapy [2,8,10,15]. The literature demonstrates that the frequent intake of medicine containing sugar can be part of the reason why this population has a higher caries risk compared to children without cardiac disease [16]. It is important to state that the patient described in this article didn't take any antibiotics for his cardiac condition, because he hadn't been previously diagnosed. Therefore, medication wasn't a factor contributing to his caries. Moreover, studies have demonstrated that patients with cardiac disease are more prone to the colonization of bacteria that lead to gingival inflammation and are more likely to have increased incidence of dental plaque, calculus, gingivitis, gingival recession and periodontitis [9,16].

Because patients with cardiac disease have a tendency to have poorer oral health, it is paramount that they have a dental home and frequent follow-ups beginning from the first years of life [2]. The patient in this article had multiple carious lesions and part of the reason for this was the family's difficulty in accessing a dental clinic or hospital because they lived in a remote area. This was a barrier even in a country like Brazil, where there is a universal health care system that provides comprehensive and free health care to the entire population and helps reduce the risk of preventable diseases like caries and periodontal disease [17].

The patient described in this article was going to undergo cardiac surgery, and because of that, eliminating all sources of infection was crucial. The literature states that using non-invasive and minimally invasive techniques to treat patients with cardiac disease can reduce the risk of systemic infection [11]. For this reason, it was decided to treat the carious teeth utilizing the Atraumatic Restorative Technique (ART). By treating his teeth, the chances of infection would decrease and also the likelihood of complications that could impact the his overall health [18].

When treating patients with a cardiac condition, the dentist needs to keep in mind that teeth with a considerable amount of decay that could more likely lead to a systemic infection should be extracted [15]. Endodontic treatment should only be considered in cases of permanent teeth with closed apices, straight canals and the ability to finish the treatment in one visit [2,9,10,15]. The patient discussed in this article needed to have one primary tooth extracted and didn't have any permanent teeth in need of endodontic treatment.

It is important to consider that patients with cyanotic heart disease are considered at an increased risk for infective endocarditis according to the American Heart Association. Because of this, procedures that involve bleeding, manipulation of gingival tissue, manipulation of the periapical region of teeth, or perforation of the oral mucosa require antibiotic prophylaxis [19]. That is why, in the case described in the article, antibiotic prophylaxis was given prior to the dental extraction.

Psychological stress has the potential to cause harm to patients with cardiac disease. It is recommended to treat these patients in a low stress environment and, if necessary, use sedation [11]. In the case described in this article, the patient's receptive behavior allowed the use of non-pharmacological management techniques to effectively and safely perform his dental treatment.

It is important to highlight that the multidisciplinary team approach benefits not only the patient, but it also allows for the integration of the different specialties of the team. This helps accomplish one of the fundamental principles of the Universal Health Care System which is a wholeness approach to providing care [20].

CONCLUSION

It is paramount that patients with cardiac disease receive comprehensive medical and dental care for their condition. The integration between the different health professionals in the multidisciplinary residency was of fundamental importance in providing the necessary care for this patient with tetralogy of Fallot.

Collaborators

CL CHANDLER, clinical care, writing the manuscript and final approval of the version to be published. MF SILVA-JUNIOR, writing the manuscript and final approval of the version to be published.

REFERENCES

1. Lorentz MN, Filho BG. Anestesia para correção de Tetralogia de Fallot em paciente adulto: relato de caso. Rev Bras Anestesiol. 2007;57(5):525-532. http://dx.doi.org/10.1590/S0034-70942007000500007
2. Assunção CM, Falleiros T, Gugisch RC, Fraiz FC, Losso EM. Tetralogia de Fallot e sua repercussão na saúde bucal. Rev Paul Pediatr. 2008;26(1):93-96. http://dx.doi.org/10.1590/S0103-05822008000100016
3. Chandrasekaran B, Wilde P, McCrea WA. Tetralogy of Fallot in a 78-year-old man. N Engl J Med. 2007;357(11):1160-1611. https://doi.org/10.1056/NEJMc063349
4. Barron DJ. Tetralogy of Fallot: controversies in early management. World J Pediatr Congenit Heart Surg. 2013;4(2):186-191. https://doi.org/10.1177/2150135112471352
5. Sousa P, Santos W, Marques N, Cordeiro P, Ferrinha R, Pereira S, et al. A 72-year-old woman with an uncorrected tetralogy of Fallot presenting with possible pulmonary endocarditis: a case report. J Med Case Rep. 2013;7:150. https://doi.org/10.1186/1752-1947-7-150
6. Kalra N, Klewer SE, Raasch H, Sorrell VL. Update on tetralogy of Fallot for the adult cardiologist including a brief historical and surgical perspective. Congenit Heart Dis. 2010;5(3):208-219. https://doi.org/10.1111/j.1747-0803.2010.00402.x
7. Pillutla P, Shetty KD, Foster E. Mortality associated with adult congenital heart disease: Trends in the US population from 1979 to 2005. Am Heart J. 2009;158(5):874-879. https://doi.org/10.1016/j.ahj.2009.08.014
8. Hallett KB, Radford DJ, Seow W. Oral health of children with congenital cardiac diseases: a controlled study. Pediatr Dent. 1992;14(4):224-230.
9. Babaji P. Tetralogy of Fallot: a case report and dental considerations; Tetralogia de Fallot: relato de caso com considerações dentárias. Rev Clín Pesq Odontol. 2009;5(3):289-292.
10. Spivack E. Tetralogy of Fallot: an overview, case report, and discussion of dental implications. Spec Care Dentist. 2001;21(5):172-175. https://doi.org/10.1111/j.1754-4505.2001.tb00250.x
11. Matos S, Resende M, Braga J. Inclusão dos primeiros molares permanentes numa criança com tetralogia de Fallot. Rev Port Estomatol Med Dent Cir Maxilofac. 2016;57(3):177-182. https://doi.org/10.1016/j.rpemd.2016.04.002
12. Kaushal D, Kalra N, Tyagi R, Khatri A, Biswas K. Pentalogy of Fallot: a case report and overview dental implications. Spec Care Dentist. 2020;40(1):121-126. http://dx.doi.org/10.1111/scd.12433
13. Elicherla SR, Bandi S, Nuvvula S, Challa RS, Saikiran KV, Priyanka VJ. Comparative evaluation of the effectiveness of a mobile

app (Little Lovely Dentist) and the tell-show-do technique in the management of dental anxiety and fear: a randomized controlled trial. J Dent Anesth Pain Med. 2019;19(6):369-378. http://dx.doi.org/10.17245/jdapm.2019.19.6.369

14. Kirklin JW, Barratt-Boyes BG. Cardiac surgery: morphology, diagnostic criteria, natural history, techniques, results, and indications. 2nd ed. New York: Churchill Livingstone; 1993.
15. Dunlop RM, Sanders BJ, Jones JE, Walker LA, Caldwell RL. Pulp therapy in pediatric patients with congenital heart disease: Survey of American Academy of Pediatric Dentistry members. J Dent Child. 2013;80(3):139-144.
16. Nosrati E, Eckert GJ, Kowolik MJ, Ho JG, Schamberger MS, Kowolik JE. Gingival evaluation of the pediatric cardiac patient. Pediatr Dent. 2013;35(5):456-462.
17. Kane SF. The effects of oral health on systemic health. Gen Dent. 2017;65(6):30-34.
18. Amaral COF, Pereira LC, Guy NA, Amaral Filho MSP, Logar GA, Straioto FG. Oral health evaluation of cardiac patients admitted to cardiovascular presurgery intervention. RGO, Rev Gaúch Odontol. 2016;64(4):419-424. http://dx.doi.org/10.1590/1981-86372016000300082979
19. American Association of Pediatric Dentistry. Guideline on antibiotic prophylaxis for dental patients at risk for infection. Pediatr Dent. 2012;34:275-279.
20. Ezébio LF, Viana KA, Cortines AAO, Costa LR. Atuação do residente cirurgião-dentista em equipe multiprofissional de atenção hospitalar à saúde materno-Infantil. ROBRAC. 2013;21(60):16-20.

Received on: 27/4/2020
Final version resubmitted on: 11/12/2020
Approved on: 16/12/2020

Assistant editor: Luciana Butini Oliveira