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LITERATURE REVIEW

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How can the dental surgeon promote oral health in patients submitted to chemotherapy?

Como o cirurgião dentista pode promover saúde bucal em pacientes submetidos à quimioterapia?

Mariana de Souza LESSA[1], Cleverson PATUSSI[1], Carolina Ferrairo DANIELETTO ZANNA[2,3], Laurindo Moacir SASSI[1], Gustavo Zanna FERREIRA[2]

1 - Hospital Erasto Gaertner, Department of Oral and Maxillofacial Surgery. Curitiba, PR, Brazil.
2 - Centro Universitário de Maringá – Unicesumar, Department of Dentistry. Maringá, PR, Brazil.
3 - University of São Paulo, Bauru School of Dentistry. Bauru, SP, Brazil.

ABSTRACT

Lesions that affect the oral cavity resulting from chemotherapy can lead to systemic impairment, increasing the length of hospital stay, impairing the patient's quality of life. Through a integrative review, this work aims to show the conduct and importance of dentists in promoting oral health and preventing an oral infectious focus. The search was performed in the Pubmed, Cochrone, SciElo and Virtual Health Library (VHL) databases, using the descriptors in English, oral care and Chemotherapy and Cancer treatment and dentistry, filtering only articles in English and published between 2006 and 2021. The search located six hundred and twenty articles, but only seven met the search criteria. One author used a mouthwash containing propolis where 65% of patients were cured on the seventh day after the onset of oral mucositis (OM) lesions. One author used cryotherapy with chamomile infusion, patients who underwent this approach did not pass grade I, being effective in reducing the occurrence of OM, and the other two authors proposed a protocol for oral cavity care. All authors obtained satisfactory results.

KEYWORDS

Dentistry; Antineoplastics; Oncology.

RESUMO

As lesões que acometem a cavidade oral decorrente ao tratamento quimioterápico podem levar a um comprometimento sistêmico aumentando o tempo de internação hospitalar, prejudicando a qualidade de vida do paciente. O foco principal do cirurgião-dentista é identificar e remover fontes de infecção na cavidade oral antes do início da quimioterapia, controlar as possíveis lesões durante o tratamento. Após o tratamento quimioterápico, o paciente retornará para os cuidados dentários gerais, proporcionando manutenção da saúde bucal e prevenção de complicações ao longo prazo do tratamento do câncer. Através de uma revisão integrativa o objetivo desse trabalho é mostrar a conduta e a importância do cirurgião-dentista para promover saúde bucal e prevenir um foco infeccioso oral. A busca foi realizada nas bases de dados Pubmed, Cochrone, SciElo e Biblioteca virtual em saúde (BVS), foram utilizados os descritores em inglês, oral care and Chemotherapy and Cancer treatment and dentistry, filtrando somente os artigos na língua inglesa, estudos com seres humanos e os artigos publicados no intervalo de 2006-2021. A busca com os descritores citados encontrou seiscentos e vinte artigos, entretanto somente sete estavam dentro dos critérios da pesquisa. Um autor utilizou bochecho de própolis, outro crioterapia com infusão de camomila e os outros dois propuseram protocolo de cuidados com a cavidade oral. Todos os autores obtiveram resultados satisfatórios.

PALAVRAS-CHAVE

Odontologia; Antineoplásicos; Oncologia.

INTRODUCTION

Chemotherapy agents cannot select only the tumor cells, causing acute toxic effects on the normal cells of our body that have their rapid mitotic activity, as is the case of the oral mucous [1]. The period in which patients are most affected by the consequences of chemotherapy is called nadir, during this period, the patient is more susceptible to infection due to immunosuppression that occurs between cycles of chemotherapy [2].

The oral cavity can be affected by lesions such as oral mucositis (OM), xerostomia, candidiasis and viral herpes, among which OM has the highest number of occurrences [3:1399]. These lesions are characterized by inflammation and ulceration of the oral mucous, causing it to be swollen, erythematous and friable, causing pain, discomfort and dysphagia. These injuries can lead to systemic impairment, increasing the length of hospital stay, impairing the patient's quality of life [4].

Ideally, dental treatment should begin before medical treatment, thus achieving good oral health. The main focus of the dentist is to identify and remove sources of infection in the oral cavity before the start of chemotherapy, to control possible injuries caused by the treatment thus providing a better quality of life for the patient. After completing cancer treatment, the patient will return to general dental care, emphasizing continuous evaluation, maintenance of oral health, and prevention of complications in the long term of cancer treatment [5].

Through an integrative review, this study aims to show behaviors that are being used by professionals in the field of dentistry in patients undergoing therapies with antineoplastic chemotherapy and the results they obtained to try to promote a higher quality of life for these patients.

METHODOLOGY

The search was performed in the databases Pubmed, Cochrone, SciElo and Virtual Health Library (VHL), the descriptors in English were "oral care and Chemotherapy" and "Cancer treatment and dentistry", filtering only articles in English that were published between 2006 and 2021. It was adopted the following inclusion criteria: patient must be or have been submitted to chemotherapy, at least one year of follow-up, and details of clinical cases or be a randomized and prospective study. The exclusion criteria were: patient has not undergone or is not undergoing treatment other than chemotherapy, any type of literary review, clinical case with less than eight patients. The PICO method (target population, intervention, comparison and result) was used P- cancer patients undergoing chemotherapy, I- treatment with the dentist, C- patients not treated with the dentist and O- oral health. The search was carried out by two researchers.

RESULTS

The search performed with the cited descriptors found six hundred and twenty articles, where fifty-seven were selected for reading the abstracts, only seven were within the search criteria (Figure 1).

Descriptive data from the studies can be seen in Table I. Five articles assessed the degree of OM, only one did not have OM through the established intervention, the other four did not develop severe OM. Three articles assessed erythema, only one had regression on the seventh day [6], another one after twenty-two days of intervention [7] and the last one did not report the duration [8]. Three articles observed the condition of xerostomia, where only one article reported that there was no significance in the results with the control group [7]. One article evaluated bleeding, however there was also no significance in the results with the control group [7]. The pain criterion was assessed by three articles [7-9], all patients reported mild to moderate pain. The ability to drink and eat was assessed by one study [6], however there was no significance in the results when compared to the control group.

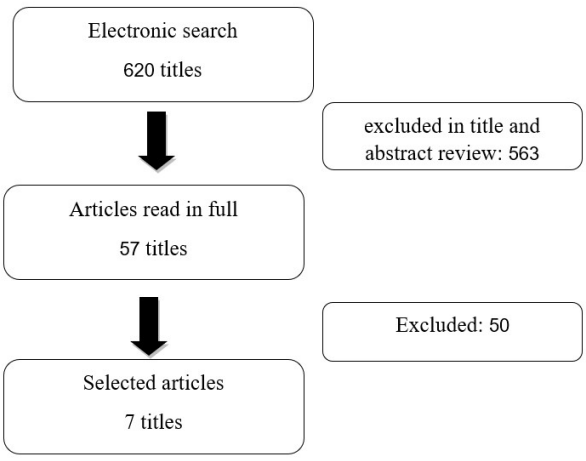

Figure 1 - Flowchart of the articles collected in the databases.

Table I - Description of the articles included in the review

Kind of study	Number of people	Middle Ages	Type of cancer	Event	Event frequency					
					Self care % (14)	POHC % (12)				
Random controlled	26	55.8 years	Breast cancer	OAG	64.3 (9)	8.3 (1)				
				Degree of oral mucositis	28.6 (4)	0.0 (0)				
				PCR	57.1 (8)	8.3 (1)				
				Saxon Test	35.7 (5)	41.7 (5)				
				Mucus	21.4 (3)	33.3 (4)				
				Electrogustometer	21.4 (3)	25.0 (3)				
Randomized pilot	38	55.9 years	Gastric, rectal cervix		Cryotherapy (18)			Cryotherapy + chamomile (n =20)		
					D8	D15	D22	D8	D15	D22
				Mouth pain	2.3 (3.1)	2.3 (3.3)	0.9 (2.8)	0.6 (1.2)	0.9 (1.5)	0 (0.0)
				Presence of mucositis (%)	38.9	38.9	11.1	20	20	5
				Degree of mucositis (%)						
				Degree 0	61.1	61.1	88.9	80	80	95
				Degree 1	22.2	27.8	5.6	20	20	5
				Degree 2	16.7	11.1	5.6	0.0	0.0	0.0
				Degree 3	0.0	0.0	5.6	0.0	0.0	0.0
				Presence of ulceration (%)	16.7	11.1	11.1	0.0	0.0	0.0
				Presence of erythema (%)	38.9	33.3	5.6	20	20	5
				Xerostomia	44.4	27.8	38.9	50	10.0	20
				Normal	44.4	72.2	61.1	30	85	75
				Hypersalivation	11.1	0.0	0.0	20	5	5
				Bleeding (%)	100	11.1	0.0	100.0	5	0.0
Prospective	86	60.5 years	Hematopoietic malignancy		A	B	C	D	TOTAL	
				Patient P (DENTAL PROTOCOL COMPLETE)	(19) 0	(177) 4	(18) 2	(20) 1	2.9% (7/234)	
				Patient Q (DENTAL PROTOCOL PARTIALLY COMPLETED)	(7) 0	(77) 26	(18) 9	(4) 1	34% (36/106)	
Randomized study	40 patients	≥18 years	Head and neck tumors			Placebo (n = 20)			Propolis (n = 20)	

POHC: professional oral health care. PCR: polymerase chain reaction. OAG: oral assessmentguid.

Table I - Continued...

Kind of study	Number of people	Middle Ages	Type of cancer	Event	Event frequency					
					Baseline	3 days	7 days	Baseline	3 days	7 days
				Erythema	1.5	1.5	1.5	2.5	1.5	0
				Hurting	1.5	1.5	1.5	1	0	0
				Ability to eat and drink		0	0	1	0	0
				Mucositis	2	2	2		1	0
Randomized study	53 patients	≥18 years	Acute Myeloid Leukemia		honey rinse 17 (100%)	Oral hygiene 17 (100%)	Group control 19 (100%)			
				Mucositis	1st week	1st week	1st week			
					Grade 0: 16 (94.1)	Grade 0: 16 (94.1)	Grade 0: 15 (78.9)			
					Grade 1: 0 (0.0)	Grade 1: 1 (5.9)	Grade 1: 4 (21.1)			
					Grade 2: 1 (5.9)	Grade 2: 0 (0.0)	Grade 2: 0 (0.0)			
					2st week					
						2st week	2st week			
					Grade 0: 13 (76.5)					
					Grade 1: 3 (17.6)	Grade 0: 15 (88.2)	Grade 0: 11 (57.9)			
					Grade 2: 1 (5.9)	Grade 1: 2 (11.8)	Grade 1: 8 (42.1)			
						Grade 2: 0 (0.0)	Grade 2: 0 (0.0)			
					3st week	3st week				
							3st week			
					Grade 0: 16 (94.1)	Grade 0: 15 (88.2)				
					Grade 1: 1 (5.9)	Grade 1: 2 (11.8)	Grade 0: 8 (42.1)			
					Grade 2: 0 (0.0)	Grade 2: 0 (0.0)	Grade 1: 7 (36.8)			
							Grade 2: 4 (21.1)			
					4st week	4st week	4st week			
					Grade 0: 17 (100)	Grade 0: 16 (94.1)	Grade 0: 9 (47.4)			
					Grade 1: 0 (0.0)	Grade 1: 1 (5.9)	Grade 1: 4 (21.1)			
					Grade 2: 0 (0.0)	Grade 2: 0 (0.0)	Grade 2: 6 (31.6)			
Randomized prospective clinical trial	34		Acute Myeloid Leukemia/ Acute Lymphocytic Leukemia		Group 1 (with intensive dental care)	Group 2 (without intensive dental care)				
				Mucositis	7th day: 27%	7th day: 42%				
					14th day: 40%	14th day: 52%				
					21st day: 40%	21st day: 47%				
					28th day: 27%	28th day: 42%				

POHC: professional oral health care. PCR: polymerase chain reaction. OAG: oral assessmentguid.

Table I - Continued...

Kind of study	Number of people	Middle Ages	Type of cancer	Event	Event frequency			
				Gingival Index (GI)		1st day: 1.45		
					1st day: 1.36	7th day: 1.52		
					7th day: 1.40	14th day: 1.66		
					14th day: 1.48	21st day: 1.69		
					21st day: 1.60	28th day: 1.70		
					28th day: 1.55			
				Oral Hygiene Index (OHI)		1st day: 1.6		
					1st day: 0.9	7th day: 1.7		
					7th day: 1	14th day: 1.8		
					14th day: 1.3	21st day: 1.9		
					21st day: 1.4	28th day: 2		
					28th day: 1.6			
				oral injuries	33 episodes	60 episodes		
				Xerostomia	40%	52.60%		
				pain in oral cavity	20%	27%		
				stomatodynia	20%	31.60%		
Prospective longitudinal study	100	63.5 years	Malignant tumors	Oral changes	- Mucositis - pain, redness, ulceration: 32%			
					- Pigmentation: 24%			
					- Lichenoid reaction: 6%			
					- Candidiasis: 28%			
					- Xerostomia: 52%			
					- Dysgeusia: 46%			
					- Dysarthria: 2%			
					Pre chemotherapy	Post chemotherapy	With oral lesions (54 patients)	No oral injuries (46 patients)
				Questionnaire on the concept of quality of life related to oral health	2.32 ± 5.92	9.66 ± 6.55	Pre chemotherapy: 4.00± 7.69	Pre chemotherapy: 0.35 ± 0.83
							Post chemotherapy: 12.37 ±7.38	Post chemotherapy: 6.48 ± 3.44

POHC: professional oral health care. PCR: polymerase chain reaction. OAG: oral assessmentguid.

One author established a protocol prior to chemotherapy, where patients were divided into two groups, one completed all dental treatment before chemotherapy and the other group did not complete it [10]. He observed the relationship of this protocol with the myelosuppressive intensity of chemotherapy divided into A (performed in an outpatient clinic, the myelosuppressive intensity was mild), B (submitted to various chemotherapy regimens, the myelosuppressive intensity was moderate), C (included induction therapy for remission of acute leukemia, the myelosuppressive intensity was severe) and D (the chemotherapies that cause severe myelosuppressive and persistent immunodeficiency). Therapies B and C were the ones that had the most negative effect on the oral cavity, there was no difference between patients with the treatment completed and the treatment not completed, however the protocol was effective to reduce complications during cancer treatment and for the health professional is aware of which chemotherapy protocol has the most harmful effect on the oral cavity [10].

One author compared the oral hygiene index (OHI) and the gingival index (GI) of patients who received oral cavity care before chemotherapy and the control group after (seven, fourteen, twenty-one and twenty-eight days) the application of chemotherapy [9]. It was observed that the group that received the previous care had fewer problems with oral hygiene and consequently less lesions in the oral cavity. Oral health-related quality of life is reported by an author through the application of a questionnaire to patients before and after chemotherapy and to those who had lesions in the oral cavity during therapy and those who had no lesions. There was a significant difference in the worsening of quality of life after chemotherapy, especially among patients who were affected by lesions in the oral cavity [8].

DISCUSSION

OM has a high percentage of occurrence in patients undergoing chemotherapy, its clinical classification is made in degrees and depends on the dose of chemotherapy received [11], the articles used in the review used the WHO classification [6,7,9] and NCI-CTCAE [12]. Lesions can cause nutritional problems due to the patient's discomfort when ingesting food and increased risk of infections [6] which can lead to hospitalization [11]. Another aggravating factor is poor oral hygiene, as it leads to an increase in bacteria in the oral cavity, increasing the risk of bacterial aspiration pneumonia [12] and worsening OM lesions ([13] by this reason is essential for the presence of the dentist in the ontological treatment [12]. Professional oral health care (PSC) reduces bacteria in the oral cavity, reducing the risk of secondary infections and oral complications due to chemotherapy treatment [13,14]. Some authors have carried out studies with methods to reduce OM in patients undergoing chemotherapy. In the study by Saito et al. [12], patients who underwent CPSO before and during chemotherapy did not have OM, in addition this protocol is relevant in the early diagnosis of other lesions in the oral cavity due to the monitoring of an oral health professional. In the study by Akhavan-Karbassi et al. [6] they used propolis as a mouthwash, the results were satisfactory for the reduction of OM, 65% of patients were cured on the 7th day after the onset of OM lesions.

Pachekenari et al. [9] carried out a study comparing a control group to another treated with a mouthwash containing honey. They followed up with the patients from the first week to the fourth week after chemotherapy application, the results were significant in the third and fourth week: only one patient in the honey mouthwash group had grade 1 OM in the third week, and no patient had MO in the fourth week. In the study by Reis et al. [7], they performed cryotherapy with chamomile infusion, patients who underwent this approach did not pass grade I, being effective in reducing the occurrence of OM. In addition to OM, the authors evaluated the presence of ulceration, erythema [6-8], xerostomia [7,8,13], presence of bleeding [7], stomatodynia [13] and ability to eat and drink [6], all studies obtained results satisfactory in improving these effects of chemotherapy in the oral cavity.

The dentist is important not only during ontological treatment, but also beforehand. In the study by Tsuji et al. [10], the authors established a dental intervention protocol prior to chemotherapy, proposing dental intervention according to the condition of the oral cavity (Chart I), relating the consequences caused by the chemotherapy protocol according to the degree of myelosuppression, having as relevance in the removal of infection foci, preventing

Chart I - Proposing dental intervention according to the condition that the oral cavity

Dental problem	Situation	Intervention
Decay	Enamel / dentin involvement	Restoration
	Pulp involvement	Endodontic treatment
Residual root	Affecting the mucosa	Burial
Dental prosthesis	Poorly adjusted	Removal
Periodontal disease	Sounding greater than or equal to 8 mmm	Extraction
	Miller class III, grade III mobility	Extraction
	Severe inflammation	Extraction
Periapical injury	Greater than 5 mm	Extraction
	Symptomatic	Extraction
Partially erupted tooth	Had history or this symptomatic	Extraction

Chart II - Description of the IHO and IG indices

ORAL HYGIENE INDEX (OHI)	GINGIVAL INDEX (GI)
0 = no plaque and calculus on tooth surfaces of tooth surface	0 = no signs of inflammation
1 = plaque and calculus on the gingival third of the tooth surface	1 = mild to moderate inflammation, slight change in color, mild edema
2 = plaque and calculus in the middle third of the tooth surface	2 = mild to moderately severe inflammation, redness, edema and vitrification
3 = plate and calculus in the incisal third	3 = severe inflammation, marked redness and edema with a tendency to bleeding and ulceration

complications. Djuric et al. [13], evaluated the oral hygiene index (OHI) and the gingival index (GI) – the scoring criteria for the OHI and GI meet (Chart II) - separated the patients into two groups, group 1: patients who underwent dental treatment before chemotherapy and group 2: patients who did not receive dental treatment before chemotherapy. A gradual increase in OHI and GA was observed during the weeks of follow-up, however the values of group 1 were significantly lower compared to group 2. In addition to the two indices, the authors compared the occurrence of OM, xerostomia, pain, stomatodynia and various injuries of the oral cavity, the results showed that group 1 had less affected compared to group 2.

Sahni et al. [8] assessed through the application of the oral health impact profile questionnaire (OHIP - 14) the quality of life related to the oral health of patients, the questionnaire was applied before and after three cycles of chemotherapy where the patients were divided into 2 subgroups, subgroup 1: with oral lesions and subgroup 2: without oral lions. The questionnaire has a 5-point scale scoring system that is coded as 0 = never, 1 = hardly ever, 2 = occasionally, 3 = quite often, and 4 = very often. The results showed that the difference between the results before and after chemotherapy was extremely statistically significant, showing the importance of monitoring the dental surgeon with patients treated with chemotherapy.

Our research obtained a small group of selected articles, due to the difficulty of finding studies that focus on the care of patients treated with chemotherapy, the large number of studies in the literature focus on patients undergoing head and neck radiotherapy treatment.

CONCLUSION

We conclude that the care of the dentist with the patient undergoing chemotherapy treatment is of the most importance in all periods of treatment, before, during and after chemotherapy cycles, as it will provide a better quality of life for the patient, avoiding the consequences of chemotherapy occur, or occur to a lesser degree.

Unfortunately, there are few studies with an emphasis on care for patients undergoing chemotherapy treatment, for this reason there was a small sample of articles, thus requiring the need for further studies focusing on care for this group of cancer patients.

Author Contributions

MSL: searched literature and drafted the paper. CP: critically reviewed the case. CFDZ: drafted the paper and critically reviewed the case. LMS: critically reviewed the case. GZF - searched literature and made the final approval.

Conflict of Interest

The authors deny any conflict of interests.

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Regulatory Statement

None.

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Mariana de Souza Lessa
(Corresponding address)
Hospital Erasto Gaertner, Department of Oral and Maxillofacial Surgery, Curitiba, PR, Brazil.
Email: marianadslessa@gmail.com

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