The Presence of Yeast-like Fungi on Maxillary Prostheses with Obturators and in Post Surgical Cavities in Patients Operated on for Maxillary Neoplasms

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Background: Majority of people have yeast-like fungi on their oral mucosa. In the case of a neoplastic disease and the use of a prosthesis with obturator, the incidence of fungi increases.

Objective: To prove the presence of yeast-like fungi prior to and after lining of the prosthesis obturator and after the use of Betadina and Silosept. Swabs were taken from the post surgical cavities and the prosthesis obturators and cultured on Sabouraud agar with gentamicin and chloramphenicol (SGC) and on IDII medium manufactured by Bio Merieux, France.

Methods: The material comprised 25 patients after removal of various maxillary tumors. All the patients had prostheses with obturators. The prostheses were disinfected with 2% solution of Silosept while the mucous membrane of the post surgical cavities was covered with 0.5% Betadina gel.

Results: Swab cultures taken prior to the treatment revealed the growth of *C. albicans* in the post surgical cavity of 80% of patients and on the prosthesis obturator in 76% of cases. *C.* species was found on both, the prosthesis obturator and in the post surgical cavity in 64% of patients. Mycological examination of the fungi isolated from the swab after lining of the prosthesis obturator and after the application of Betadina and Silosept revealed the presence of *C. albicans* on the prosthesis obturator and in the post surgical cavity in 68% of patients. *Candida* species was revealed in the post surgical cavity in 84% of cases and on the prosthesis obturator in 88% of patients.

Conclusion: The presence of yeast-like fungi in post surgical cavity and on the prosthesis obturator was confirmed in about 90% of cases. The fungi may be predisposed to the inflammatory conditions, which may contribute to the neoplastic metaplasia. Applied concentrations of Betadina and Silosept preparations proved ineffective in the eradication of the fungi, that is why further investigation is necessary in order to determine effective concentrations of the above agents and/or search for other effective measures. **[Kor J Med Mycol 2003; 8(1): 1-6]**

Key Words: *Candida albicans*, Maxillary tumours, Maxillary prostheses with obturators

INTRODUCTION

Majority of healthy population reveals the presence of yeast-like fungi on oral mucosa[1~4]. In the case of neoplastic disease, the incidence of fungi increases[5]. The use of acrylic prosthesis increases the colonization of oral mucosa with fungi, especially if the prosthesis is lined with soft materials[6~12]. Our own clinical observations as well as preliminary studies demonstrated the symptoms of post surgical cavity inflammation due to yeast-like fungi

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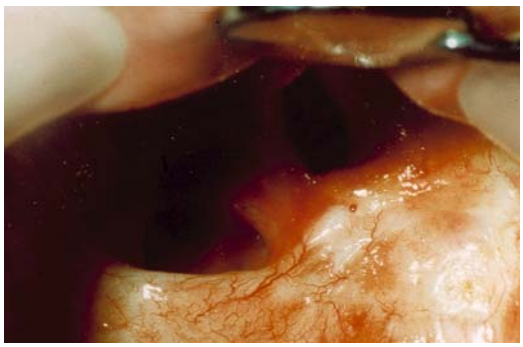

Fig. 1. Condition after partial resection of the maxilla.

Fig. 3. Prostheses in the oral cavity.

Fig. 2. Complete maxillary prosthesis with obturator lined with soft material Mucopren soft and complete prosthesis of the mandible.

commonly occurring in patients with surgically removed maxillary tumour in whom the post surgical cavity was closed by means of prosthesis obturator[13]. Since there was no data in available literature concerning mycological examinations in such patients and the effective therapeutic methods, we have decided to undertake the studies.

MATERIALS AND METHOD

A group of 25 patients, including 8 women and 17 men, after surgical removal of various maxillary tumours was examined (Fig. 1). The procedure and the surgical treatment were carried out at the Department and Clinic of Maxillo-Facial Surgery of Medical University in Wrocław, prosthetic treatment was carried out at the Department of Dental Prosthetics, while mycological examinations were carried out at Mycological Laboratory of Department and Clinic of Dermatology.

Dental prostheses were made immediately after surgical removal of the tumour, and next they were modified. At the time of mycological examinations, 6 patients used obturating plates (in one case made from acrylic resin, in five cases − from thermoplastic copoliester Erkodur manufactured by Erkodent − Germany), next 6 patients used partial prostheses with obturators, three of them being made from acrylic resin, the others were frame prostheses, and 13 patients were comforted with complete acrylic prostheses with obturators (Fig. 2, 3). Twenty-three obturators were lined with soft material, Ufi-Gel C manufactured by Voco, Germany (18 cases), Visco-gel manufactured by DeTrey, G. Britain (3 cases), Palasiv manufactured by Kulzer-Hereus, Germany (2 cases). The remaining two acrylic obturators were not lined.

Mycological examination was done to the patients at various periods after the operation: 6 patients were 3 to 4 years after the surgery, 11 patients were 5 to 8 years after the surgery, 5 patients were 9 to 12 years after the surgery. Other patients were operated 16, 18 and 19 years ago.

Swab cultures were taken from the surface of prosthesis obturator and the mucous membrane

Table 1. Detailed demographic data of the patients

No	Sex	Age	No of years after surgery	Diagnosis	Type of used prosthesis	Lining material
1	M	24	4	Chondrosarcoma	Complete denture with obturator	Ufi-Gel C
2	M	68	19	Planoepithelial carcinoma	Complete denture with obturator	Palasiv
3	M	66	5	Keratotic planoepitherial carcinoma	Complete denture with obturator	Ufi-Gel C
4	M	77	6	Melanoma malignum	Complete denture with obturator	Ufi-Gel C
5	F	45	12	Monomorphic adenoma	Partial frame denture with obturator	Ufi-Gel C
6	F	77	9	Metastatic planoepithelial carcinoma	Complete denture with obturator	Palasiv
7	F	53	5	Keratotic planoepithelail carcinoma	Complete denture with obturator	Ufi-Gel C
8	M	53	6	Necrotic carcinoma of the nasal sinus GII	Acrylic obturating plate	Visco-gel
9	M	61	8	Carcinoma of the right side of maxilla and nose. T-3, N-1, M-0	Complete denture with obturator	Ufi-Gel C
10	M	58	12	Planoepithelial carcinoma of the maxilla	Complete denture with obturator	Ufi-Gel C
11	M	69	5	Keratotic planoepithelial carcinoma	Complete denture with obturator	Ufi-Gel C
12	M	58	16	Neurofibrosarcoma	Partial acrylic prosthesis with obturator	Ufi-Gel C
13	M	46	8	Cystic adenocarcinoma (Cylindroma)	Partial acrylic prosthesis with obturator	No lining
14	F	47	11	Chondrosarcoma	Frame denture with obturator	Ufi-Gel C
15	F	70	5	Planoepithelial carcinoma	Complete denture with obturator	Visco-gel
16	M	73	5	Keratotic planoepithelial carcinoma	Complete denture with obturator	Visco-gel
17	M	58	9	Planoepithelail carcinoma	Complete denture with obturator	Ufi-Gel C
18	F	42	3	Nasopharyngeal carcinoma	Erkodur obturating plate	Ufi-Gel C
19	F	68	3	Planoepithelial carcinoma	Erkodur obturating plate	Ufi-Gel C
20	M	42	3	Cystic adenocarcinoma	Partial acrylic denture with obturator	Ufi-Gel C
21	M	64	18	Adenocarcinoma	Complete denture with obturator	Ufi-Gel C
22	M	72	8	Basal cell carcinoma	Erkodur obturating plate	Ufi-Gel C
23	M	57	3	Keratotic planoepithelial carcinoma	Erkodur obturating plate	Ufi-Gel C
24	F	56	3	Keratotic planoepithelial carcinoma	Erkodur obturating plate	Ufi-Gel C
25	M	45	7	Keratotic papillary planoepithelial carcinoma	Frame denture with obturator	No lining

covering the post surgical cavity. The material was cultured on Sabouraud agar with gentamicin and chloramphenicol (SGC) as well as on IDII medium manufactured by Bio Merieux, France. The findings were obtained after 48 hours according to manufacturers' recommendations. The growth of the fungi and its intensity were evaluated. In accordance with the study protocol, the lining was removed from post surgical prostheses on the same visit when the swabs were taken. Then the obturators were lined directly with Mucopren soft manufactured by Kettenbach, Germany. In order not to allow the growth of yeast-like fungi, the prostheses lined with a new soft material were disinfected.

For that reason, 2% solution of Silosept manu-

Table 2. Results of the mycological investigations

No	Fungi isolated from the swab prior to treatment		Fungi isolated from the swab after the use of Betadina and Silosept	
	Post surgical cavity	Prosthesis obturator	Post surgical cavity	Prosthesis obturator
1	*C. albicans*	*C. albicans*	*C. albicans* *C. species* *C. kefyr*	*C. albicans* *C. species* *C. kefyr*
2	*C. albicans*	*C. albicans*	*C. albicans* *C. species* *C. kefyr*	*C. albicans* *C. species* *C. kefyr*
3	*C. albicans* *C. species*	*C. species*	*C. species* *C. kefyr* *C. tropicalis* *C. lusitianae*	*C. species* *C. kefyr* *C. tropicalis* *C. lusitaniae* *C. guilliermondi*
4	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species* *C. kefyr*	*C. albicans* *C. species*
5	*C. species*	*C. albicans*	*C. albicans*	*C. albicans*
6	*C. albicans* *C. species*	*C. albicans*	*C. albicans* *C. species*	*C. albicans* *C. species*
7	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*
8	*C. albicans*	*C. albicans*	*C. albicans* *C. species*	*C. albicans* *C. species*
9	*C. albicans*	*C. albicans*	*C. species* *C. kefyr*	*C. species* *C. kefyr*
10	*C. albicans*	*C. albicans*	*C. species* *C. kefyr*	*C. species* *C. kefyr*
11	----------	----------	*C. species*	*C. species* *C. kefyr*
12	----------	----------	*C. albicans* *C. species* *C. kefyr*	*C. albicans* *C. species* *C. kefyr*
13	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. kefyr*	*C. kefyr*
14	*C. albicans*	*C. species*	*C. albicans* *C. species*	*C. species* *C. kefyr*
15	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*
16	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species* *C. kefyr*	*C. albicans* *C. species* *C. kefyr*
17	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. species* *C. kefyr kefyr*	*C. species* *C. kefyr*
18	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species* *C. kefyr*	*C. albicans* *C. species* *C. kefyr*
19	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. species* *C. kefyr*	*C. species* *C. kefyr*
20	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. species* *C. kefyr*	*C. species* *C. kefyr*
21	----------	*C. species*	----------	----------
22	*C. albicans* *C. species*	*C. albicans* *C. species*	----------	*C. albicans* *C. species* *C. kefyr*
23	*C. species*	*C. species*	*C. species* *C. kefyr*	*C. species* *C. kefyr*
24	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*
25	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*	*C. albicans* *C. species*

factured by Kettenbach, Germany was used and the patients were recommended to apply the solution for 10 minutes on the surface of the prosthesis once a day and to wash the prosthesis under running water after the evening meal. The patients were also given 0.5% gel − Betadina manufactured by Egis Pharmaceuticalis Ltd, Hungary with the recommendation to use it for the night after disinfecting the prosthesis with 2% solution of Silosept. They had to apply the gel on the prosthesis obturator before placing it into the oral cavity. The patients were to use both agents for 3 weeks and came for the check-up on the 21st day, when swabs were taken and cultured.

RESULTS

Table 1 presents detailed demographic data of

the patients. Twelve patients were suffering from planoepithelial carcinoma (Carcinoma planoepitheliale); two patients were suffering from chondrosarcoma and two had cystic adenocarcinoma (Ca. adenoids cysticum). There were also few cases of malignant melanoma, monomorphic adenoma (Adenoma monomorphicum), neurofibrosarcoma and adenocarcinoma. The remaining 5 patients revealed necrotic carcinoma of the nasal sinus (Ca. sinonasale GII necroticans), carcinoma of the right side of the maxilla and the nose (Ca. maxillae et nasi lat. Dextri T-3, N-1, M-0), nasopharyngeal carcinoma (Ca. nasopharyngialae), casal cell carcinoma (Ca. basocellulare), keratotic planoepithelial carcinoma (Ca. planocellulare keratodens).

Table 2 presents the results and discussion of the mycological investigations. Mycological studies of the swabs prior to treatment revealed the presence of *Candida albicans* in the post surgical cavity of 80% of patients and on the surface of prosthesis obturator in 76% of cases. The presence of *C.* species in the post surgical cavity was found in 64% of cases and on the prosthesis obturator in 64%. Three patients (12%) were free from any yeast-like fungi in the post surgical cavity, and 8% of patients were free from any fungi on prosthesis obturator.

The fungi isolated from the swab after lining of the prosthesis obturator with Mukopren and after application of Betadina and Silosept found within the post surgical cavity as well as on the surface of the obturator were of various pattern. Other isolated species included *C. kefyr*, *C. tropicalis*, *C. lusitaniae* and *C. guilliermondi*.

C. albicans was found in the post surgical cavity and on the prosthesis obturator in 68% of cases. *C.* species was found in the post surgical cavity in 84%, while on the prosthesis obturator in 88% of cases. *C. kefyr* was found in the post surgical cavity in 56% and on the obturator in 64% of cases. *C. tropicalis* and *C. lusitaniae* were found both in the post surgical cavity and on the prosthesis obturator in 4% of patients. *C. guilliermondi* was found only on the surface of the obturator in 4% of cases. Absence of yeast-like fungi, both in the post surgical cavity and on the obturator was found in 4% of cases.

To sum up, after treatment the incidence of *C. albicans* in the post surgical cavity decreased by 12% and on the surface of the obturator by 8%. The incidence of *C.* species after treatment increased in the post surgical cavity by 20% and on the surface of the obturator by 24%. The increase of *C. kefyr*, *tropicalis*, *lusitaniae*, *guilliermondi* was observed sporadically in 4% of patients.

DISCUSSION

Vast majority of non-operated patients with acrylic prosthesis possess yeast-like fungi on their oral mucosa. Data from literature indicates the rise in temperature between the mucous membrane and the prosthesis plate in patients treated prosthetically. Our investigations revealed the increased incidence of fungi and inflammatory conditions on oral mucosa of about 90% of cases. The increased incidence of fungi might have been caused by decreased immunity of the organism after a surgical removal of the tumour and following chemotherapy and radiotherapy. The situation might have been caused by mutual infections and the development of fungi present in the post surgical cavity and on the prosthesis obturator. Observed change in the pattern of fungi may be explained by the selection occurring under the influence of administered disinfecting agents. That is why further studies on the use of Betadina and Silosept preparations should be considered in order to determine the effective concentrations of the agents capable of limiting the amount of the fungi and decreasing the incidence of inflammatory conditions of the oral mucosa which in their chronic form may lead to neoplastic metaplasia.

CONCLUSIONS

The presence of yeast-like fungi was found in the post surgical cavity as well as on the surface of prosthesis obturator in 90% of patients using soft material lined prosthesis with obturator. The presence of the fungi may predispose to the development of inflammatory condition which in its chronic form may lead to neoplastic metaplasia of the mucous membrane. Preparations Betadina and Silosept in applied concentrations proved ineffective in eradication of the fungi on the mucous membrane as well as on the obturators.

Further studies are necessary in order to determine effective concentrations of the above-mentioned preparations as well as to search for new agents.

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