ISSN 1807-5274
Rev. Clín. Pesq. Odontol., Curitiba, v. 6, n. 1, p. 49-55, jan./abr. 2010

THE INTRAORAL VIDEO CAMERA: a diagnostic tool in the exam of patient with increased oral cancer risk

A vídeo-câmera intraoral como instrumento auxiliar no exame dos pacientes com risco aumentado para câncer bucal

Danielle Castex Conde[a], Terezinha Lisieux Lopes Calandro[b], Isabelle Taveira Campos[c], Eliane Pedra Dias[d]

[a] PhD, Pathology, Universidade Federal Fluminense, Niterói, RJ - Brasil, e-mail: daniellecastex@yahoo.com.br
[b] Graduate student, Program in Pathology, Universidade Federal Fluminense, Niterói, RJ - Brasil.
[c] MsC, Pathology, Graduate Program in Pathology, Universidade Federal Fluminense, Niterói, RJ - Brasil.
[d] PhD, Pathology, Head of the Pos-Graduate Program in Pathology, Universidade Federal Fluminense, Niterói, RJ - Brasil.

Abstract

OBJECTIVE: To compare the findings of the clinical examination of the oral cavity with and without the aid of an intraoral video camera ("videoroscopy") with the purpose of diagnosing epithelial precursor lesions (leukoplakia, erythroplakia and actinic cheilitis) and precancerous conditions (lichen planus). **MATERIALS AND METHODS**: Both forms of examination were performed in 100 patients with increased risk of oral cancer. All patients were examined without the aid of any enlargement apparatus before the intraoral video camera was used. After each of the exams, the presence or absence of epithelial precursor lesions or lichen planus was recorded. In the event a lesion was found, a digital picture was taken a toluidine blue staining test was performed and then a biopsy was done. **RESULTS**: Of the patients with epithelial precursor lesions or lichen planus, 80% of the lesions had been observed in both of the examinations while 7% only had been diagnosed the after the videoroscopy. The results of the histopathological analysis and the toluidine blue staining tests are also presented. **CONCLUSIONS**: In this study videoroscopy is suggested for use on a regular basis in patients with an increased risk of oral cancer in an attempt to diagnose early lesions, select of the best area to be biopsied and during the following up of these lesions.

Keywords: Early diagnosis. Oral cancer. Epithelial precursor lesions. Intraoral video câmera.

Resumo

***OBJETIVO**: Comparar os achados do exame clínico da boca com e sem auxílio da vídeo-câmera intrabucal (videoroscopia) com o propósito de diagnosticar lesões epiteliais precursoras (leucoplasia, eritroplasia, eritroleucoplasia e queilite actínica) e condições pré-cancerosas (líquen*

plano). ***MATERIAL E MÉTODOS****: Os exames foram realizados em 100 pacientes com risco aumentado para câncer oral. Todos os pacientes foram examinados sem o auxílio de qualquer aparelho de aumento antes que a vídeo-câmera intrabucal fosse usada. Após cada exame, a presença ou ausência de lesões epiteliais precursoras ou líquen plano foram anotadas. Nos casos em que lesões foram diagnosticadas, fotografaram-se as lesões, bem como o teste do azul de toluidina e a biópsia.* ***RESULTADOS****: Dos pacientes com lesão epitelial precursora ou líquen plano, 80% das lesões foram observadas em ambos os exames, enquanto 7% foram somente diagnosticadas após a videoroscopia. Os resultados histopatológicos e dos testes com azul de toluidina foram também discutidos.* ***CONCLUSÕES****: Sugere-se a utilização regular da videoroscopia nos pacientes com risco aumentado para o câncer de boca, para auxiliar o diagnóstico de lesões precoces, na seleção da melhor área para a biópsia e acompanhamento dessas lesões.*

Palavras-chave*: Diagnóstico precoce. Cancer bucal. Lesões epiteliais precursoras. Vídeo-câmera intrabucal. Exame clínico.*

INTRODUCTION

The number of new cases of oral and oropharyngeal cancer is estimated to be 300.000 worldwide, corresponding to 3% of all forms of cancer (1). Squamous cell carcinoma represents over 90% of the oral malignant neoplasms and is defined by the World Health Organization (WHO) as an invasive epithelial neoplasm with varying degrees of squamous differentiation and propensity to early and extensive lymph node metastases, occurring predominantly in alcohol and tobacco-using adults in the 5th and 6th decades of life (2). However, for carcinoma of the lip vermilion, the excessive exposure to the sunlight is also considered to be a factor associated with this malignancy (1, 2). Most of the squamous cell carcinomas are preceded by lesions called epithelial precursor lesions (formerly called premalignant lesions), defined by the WHO as altered epithelium with increased likelihood for progression to squamous cell carcinoma. The principal oral precursor lesions are the white patches (leukoplakia), the red patches (eriythroplakia) or the mixed red and white lesions (2). The actinic cheilitis, also known as actinic cheilosis, is considered as an epithelial precursor lesion to the squamous cells carcinoma of the lip vermilion (3).

In several studies, theoral lichen planus is related to a risk of malignant transformation between 0.4% and 3.7% (2, 3), and therefore is considered to be a precancerous condition (Barnes). However, this risk is still a controversial issue. The identification of the epithelial precursor lesions and precancerous conditions, as well as the intervention in early stages, constitute one of the keys to the reduction of the mortality, morbidity and costs associated with the oral cancer treatment (4).

Some procedures are used as aids for the early detection of the oral cancer, especially among patients with an increased risk of malignancy. Toluidine blue staining has been widely used with this objective, however a high percentage of false positives and negatives is associated with this technique (5-8).

Stomatoscopy is a clinical method of observation of the mouth through the magnification of the image under adequate lighting with the objective of evaluating modifications of the mucosal surface, as well as in the underlying vascular net (9, 10).

Several authors used this technique mainly with the objective of diagnosing epithelial precursor lesions and oral carcinomas in early stages and

improve the selection of the area for a biopsy (11-14). However, difficulties in the exam of the oral cavity with the colposcope have been reported, mainly in relation to the size of the apparatus and the access to the posterior regions of the mouth. In an attempt to get better magnification of the image and better adaptation to the mouth, other instruments were used, such as the microcolpohysteroscope, which still has not been considered adequate for this purpose (15, 16).

The intraoral video camera was introduced in dentistry in 1987. Initially, its indications were patient's documentation, motivation and instruction of oral health, explanation of treatment goals, as well as the diagnosis of incipient caries, faulty restorations and detection of the root canals entrance orifice (17-20). The use of the intraoral video camera for the clinical exam of patients with increased risk for oral cancer with the propose of diagnosing early lesions still has not been reported in the literature. The authors named this exam ***videoroscopy***.

The aim of this study is to compare the findings of the clinical examination of the mouth with and without the aid of the intraoral video camera – videoroscopy – with the purpose of diagnosing epithelial precursor lesions (leukoplakia, erythroplakia and actinic cheilitis) and precancerous conditions (lichen planus).

MATERIALS AND METHODS

The research project of this study was submitted and approved by the Ethical Committee in Research of the Fluminense Federal University in Niterói, Brazil. The sample was consisted of 100 patients with an increased risk of oral cancer (smokers, ex-smokers, drinkers, ex-drinkers and only for the lip vermilion carcinoma, patients with excessive exposure to ultraviolet rays). All patients signed a detailed informed consent form that described the purpose of the study as well as their role and responsibilities prior to their participation. Both the traditional clinical examinations and the intraoral video camera exams took place at the Oral Diagnosis Clinic of the Antônio Pedro Hospital, at Fluminense Federal University (Niterói, Rio de Janeiro, Brazil). All the patients were initially examined without the aid of any magnification apparatus. After this procedure, if epithelial precursor lesions or oral lichen planus were found during this examination then a digital picture was taken.

The videoroscopy was done afterwards by the same examiner. For this exam, a 28x enlargement intraoral video camera was used (Activeware Projetos & Produtos – model V4) (São Paulo, São Paulo, Brazil). During the procedure, the images of eventual epithelial precursor lesions or lichen planus were captured.

A toluidine blue staining test was done in every lesion found, using the following protocol:

- Removal of the mucus with 1% acetic acid;
- Application of 1% toluidine blue for one minute, then rinse the mouth with water;
- Removal of the excess of pigmentation with 1% acetic acid;

Excisional biopsies were performed in lesions smaller than 1cm, while incisional biopsies were chosen for the ones bigger than 1cm. The tissue removed in the biopsy was taken to the Pathology Service of the Antônio Pedro Hospital at Fluminense Federal University.

RESULTS

Out of the 100 patients examined, most were male (55%), white (54%), smokers (46%) and drinkers (47%). The ages ranged from 18 to 76 years old, with an average of 50.6 (± 11,52) years old (Table 1).

Table 1 - Sex, race and risk factors in relation to patients examined and patients with lesions

	SEX		RACE			RISK FACTOR						
	male	female	white	black	brown	smoker	ex-smoker	non-smoker	drinker	Ex-drinker	Non-drinker	Excess exposure to solar radiation
Total of patient	55 (55%)	45 (45%)	54 (54%)	24 (24%)	22 (22%)	46 (46%)	43 (43%)	11 (11%)	47 (47%)	33 (33%)	11 (11%)	1 (1%)
Patient with lesions	13 (52%)	12 (48%)	15 (60%)	5 (20%)	5 (20%)	14 (56%)	6 (24%)	5 (20%)	11 (44%)	6 (24%)	8 (32%)	----

Seventy-three percent of the patients showed no epithelial precursor lesions or oral lichen planus in either examination. In 18% of the patients lesions were detected in both exams and in 7% the lesions were only diagnosed after the videoroscopy (Figure 1).

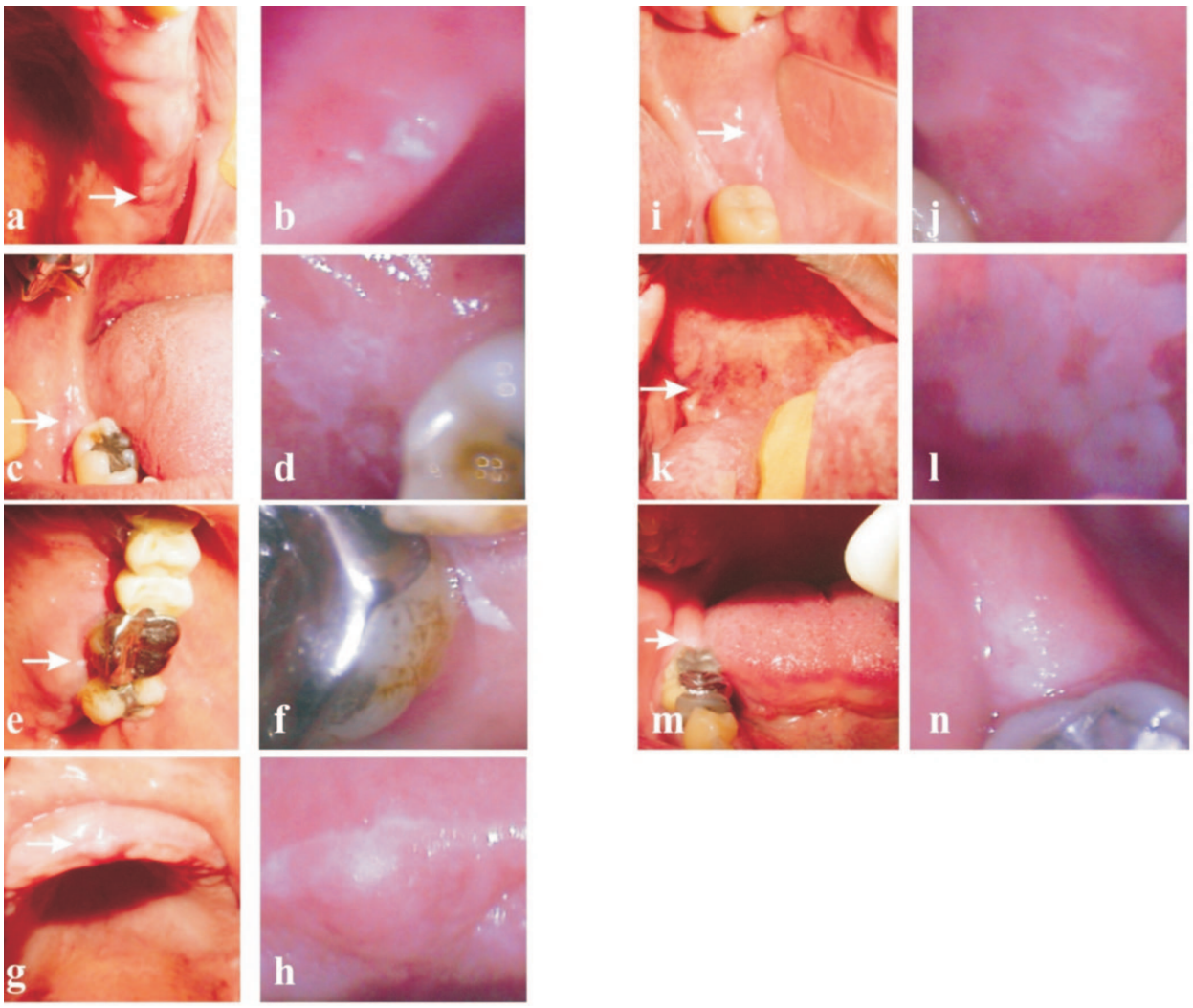

Figure 1 - Lesions initially observed through videoroscopy
a, c, e, g, i, k, m – aspect observed during clinical exam.
b, d, f, h, j, l, n – aspect observed during videoroscopy.

Out of the patients with lesions, most were women (52%), white (60%), smokers (56%) and drinkers (44%). Their ages ranged from 29 to 66 years old, with an average of 50,7 (±10,6) years old (Table 1). The clinical diagnosis of the 25 lesions found were 17 (68%) leukoplakias, 3 (12%) leukoerythroplakias, three (12%) oral lichen planus, one (4%) proliferative verrucous leukoplakias and one (4%) actinic cheilitis.

The toluidine blue staining test was positive only in four (16%) of the 25 lesions. In two of these lesions the stain occurred in an ulcer area. All of these four lesions were observed during the clinical exam as well as in the videoroscopy. Twenty lesions were analyzed through biopsy. The lesions that were observed in both exams (18), were diagnosed, after the histopathological analysis, as epithelial hyperplasia without dysplasia in seven cases, oral lichen planus in five cases, epithelial hyperplasia with mild dysplasia in three cases, epithelial hyperplasia with moderate dysplasia in one case and proliferative verrucous leukoplakia with severe dysplasia in one case. One patient did not return for a biopsy.

Out of the seven lesions diagnosed only during the videoroscopy, three were biopsied. The histopathological exam showed one mild epithelial dysplasia, one moderate epithelial dysplasia and one epithelial hyperplasia without dysplasia. Two patients in this group did not return for biopsy. Two others, despite having lesions, were only followed clinically and through videoroscopy because their lesions appeared smaller when re-evaluated at the time of the biopsy. They were then considered to be caused by trauma. Both lesions resolved in about approximately six months (Figure 2).

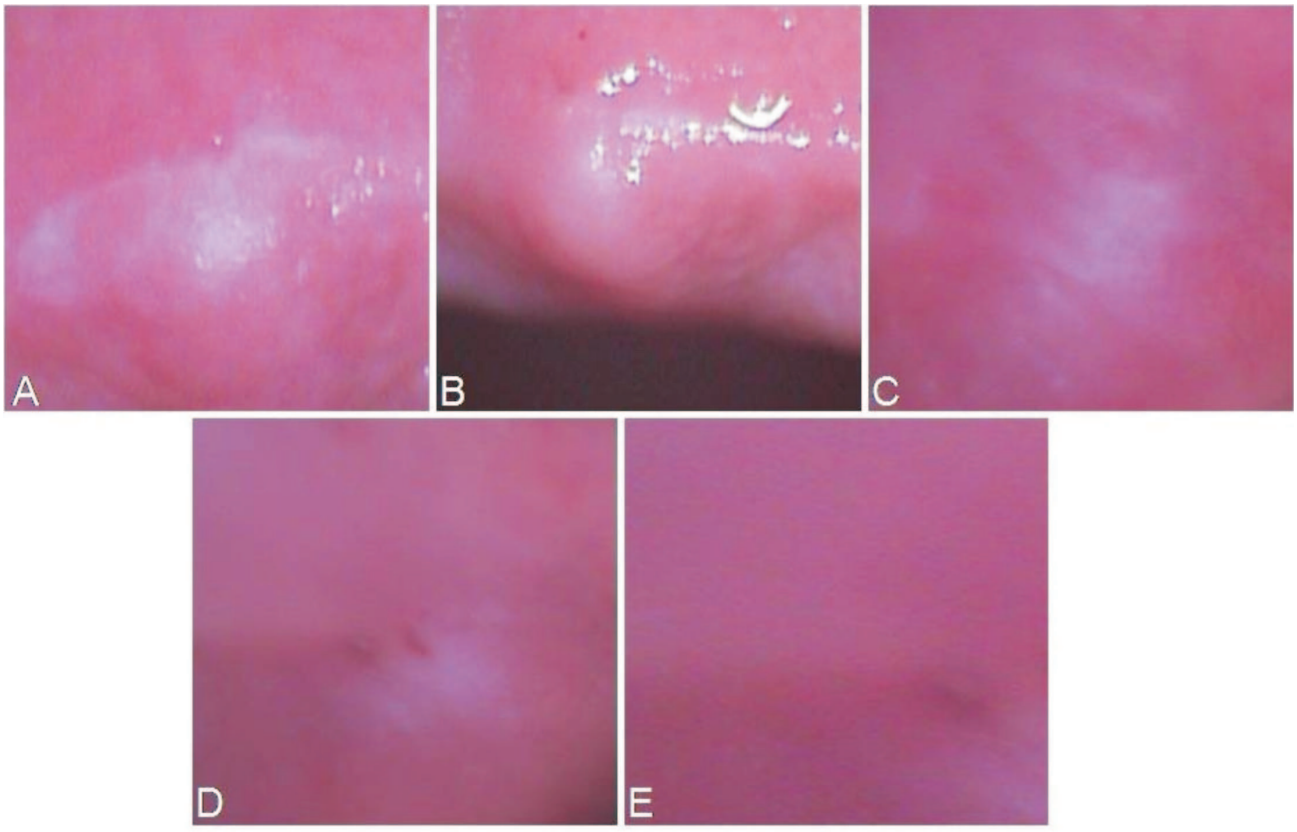

Figure 2 - Follow up by videoroscopy showing regression of the lesions
The white plaque in the superior alveolar ridge (a) shows regression in 6 months (b).
The white plaque in the left buccal mucosa (c) shows reduction in three months (d) and regression in 6 months (e).

DISCUSSION

Women were slightly more affected by the epithelial precursor lesions than men. Probably this result is a consequence of the increase of smoking and drinking between women. Just as reported in the literature, leukoplakia was the most common epithelial precursor lesion (3). The five year survival for oral squamous cells carcinoma is 82% when the lesions are located at the moment of the diagnosis, 48% when the lesions spread to regional lymph nodes and 26% when the lesions show distant metastases. Despite the advancements in the cancer therapy, the five year survival rate for the oral and oropharynx cancer is still just 57% (1). Thus, procedures to early diagnose oral cancer are extremely useful as they can reduce mortality, morbidity and costs associated with treatment (3). One of the most important ways to get an early diagnosis is the detection of epithelial precursor lesions and precancerous conditions.

However, a considerable proportion of the epithelial precursor lesions may be clinically undetectable leading to a late diagnosis. For this reason, simple auxiliary methods are fundamental to change this picture. The toluidine blue staining test and the citopathology exam are the main auxiliary methods reported in the literature (4). However, these methodologies revealed favorable results in terms of epithelial precursor lesions detections, as was demonstrated with the toluidine blue staining in this study as well as other studies (5-7). Moreover, some authors have emphasized the importance of a careful visual exam of the oral cavity aided by adequate illumination and visual magnification (11, 13).

In this study, if the toluidine blue staining had been the only auxiliary method to the clinical exam used in the evaluation of these patients to diagnose epithelial precursor lesions, there would be failure in the diagnosis of the seven lesions that were only observed initially using videoroscopy, because all of them were negative in this test. Additionally, it is important to point out that two out of the four lesions stained by the toluidine blue were pigmented in an ulcer area, a situation which is associated with most of the false positive results with this test.

The seven lesions initially observed only through the videoroscopy were not invisible in the clinical exam; however, due to the size, thickness or location, they went unnoticed in this first exam. The diagnosis of those lesions through the intraoral video camera was made easier by the lighting and the magnification (28x) provided by this tool. After detection of the epithelial precursor lesion, another critical step is the choice of the appropriate site to perform an incisional biopsy because the microscopic characteristics may vary in non-uniform lesions. If only areas where few cellular alterations are present undergo biopsy, this pattern will be considered a representative of the lesion as a whole, even though there will be areas with more severe cellular alteration, leading to misdiagnosis and inadequate treatment (4).

The videoroscopy can reveal details of the lesion surface and of the underlying vascular net which may help in the selection of the biopsy area. In this sense, comparative studies with methods that have already been established in the literature, such as the toluidine blue staining test, should be conducted.

Another important role of the videoroscopy is the follow up of the patients with epithelial precursor lesions in which incisional biopsy showed mild or no dysplasia, and so surgical excision in not mandatory. Most of the examiners may not remember the aspect of each lesion some time after it was first seen. Due to the possibility of capturing and storing the images, the videoroscopy will allow their comparison, seeking clinical modifications that could indicate and direct a new biopsy. In this study the videoroscopy was a great auxiliary clinical method of following up the two patients with white plaque that could not be removed and that disappeared in about six months.

CONCLUSION

This study suggests videoroscopy may be used in a regular basis in patients with increased risk for oral cancer, in an attempt to diagnose early lesions, selection of the best area to be biopsied and during the monitoring of these lesions.

CONFLICT OF INTEREST STATEMENT

The authors declared no conflict of interest in the present manuscript.

INFORMED CONSENT STATEMENT

The patients signed an informed consent, kept in the records, in the archives of the Universidade Federal Fluminense.

ACKNOWLEDGEMENT

The authors would like to thank Dr. Paulo da Costa Rodrigues for reviewing this paper.

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Received: 08/15/2009
Recebido: 15/08/2009

Accepted: 10/27/2009
Aceito: 27/10/2009