

Oral Cavity Mucosal Resurfacing Using Argon Beam Coagulator

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ABSTRACT

Title:
Oral Cavity Mucosal Resurfacing Using Argon Beam Coagulator

Objectives:
1. Describe a new method of managing dysplastic lesions of the oral cavity using the argon beam coagulator (ABC).
2. Describe surgical outcomes of mucosal resurfacing using the ABC.
3. Discuss various advantages of the ABC in therapeutic management of field cancerization of oral mucosa.

Methods:
Retrospective case series. Three patients at a tertiary care hospital with diagnosis of squamous cell carcinoma of the oral cavity and subsequent histopathologic confirmation of new dysplastic oral cavity lesions underwent mucosal resurfacing of the oral cavity using an argon beam coagulator from September, 2008 to December, 2009. Resolution of dysplasia, erythroplakia, and leukoplakia at the surgical site, ability to tolerate oral intake, and progression of dysplasia were assessed and compared to the pre-operative findings.

Results:
All three patients with severe dysplastic lesions of the oral mucosa showed reduction of dysplasia, erythroplakia, and leukoplakia at the site of ablation using the ABC. All three patients were able to resume food intake by mouth immediately after surgery, and none had increase in zone of dysplasia at the site of ablation on follow-up.

Conclusions:
The introduction of ABC in mucosal resurfacing of the oral cavity enhances otolaryngologists' ability to address dysplastic lesions of the oral cavity especially in patients with field cancerization. Mucosal resurfacing using the ABC provides a quick and safe new option toward treatment of dysplastic mucosa and a good functional outcome.

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INTRODUCTION

Multiple treatment modalities exist for squamous cell carcinoma affecting the head and neck. Despite an effective treatment of the primary lesion, there exists 3% to 4% per year incidence for second primary malignancy in the head and neck.¹ In particular for oral cavity carcinoma, risk for multiple sites of premalignant and malignant changes in proximity to the primary site is thought to be due to long term exposure of the entire mucosal surface to tobacco and alcohol.^{2,3} Treatment of these dysplastic premalignant lesions is challenging especially in oral cavity where prior intervention was performed for the initial primary cancer. An aggressive surgical approach to these premalignant lesion may adversely affect speech in swallowing function. Due to superficial nature of these oral cavity dysplasia, ablative methods using various types of lasers and electrocautery devices have been developed.

Argon beam coagulator (ABC) is another FDA approved tool currently available to surgeons in ablating these dysplastic lesions with precision.⁴ In addition, ABC provides slightly deeper penetration and addresses wider area of dysplasia compared to the commonly used CO2 laser.⁵ Several dysplastic oral mucosal lesions have been managed using the ABC at Louisiana State University Health Sciences Center Shreveport resulting in adequate ablation of the dysplasia with minimal effect on function of speech and swallowing. Reporting of these cases of effective management of oral mucosal dysplasia using argon beam coagulator in our scientific literature will help inform other otolaryngologists to widen their selection of laser/electrosurgery devices for managing similar type of lesions in the oral cavity.

METHODS AND MATERIALS

Retrospective case series. Three patients at a tertiary care hospital with prior history of squamous cell carcinoma of the oral cavity who subsequently developed histopathologic confirmation of new dysplastic oral cavity lesions that underwent mucosal resurfacing of the oral cavity using an argon beam coagulator from September, 2008 to December, 2009. Resolution of dysplasia, erythroplakia, and leukoplakia at the surgical site, ability to tolerate oral intake, and progression of dysplasia were assessed and compared to the pre-operative findings

RESULTS

Case 1.
A 57 y.o. Caucasian man with a history of T1N0M0 squamous cell carcinoma (SCC) of the floor of mouth treated with surgical resection in 2005 who presented with multiple areas of moderate to severe dysplasia of the oral cavity mucosa in 2007, 2008, and 2009. Past medical history is also significant for HIV. Moderate to severe dysplasia of the ventral tongue approximately 1.5cm in size was confirmed on incisional biopsy prior to the ablative procedure. Multiple stiff and irregular dysplastic lesions of the ventral tongue and the floor of mouth were ablated using the ABC at 80 Watts. Good hemostasis was achieved during the ablation. The patient tolerated oral intake immediately after surgery after recovering from sedation and was back to taking all nutrition by mouth on one week post ablation. No hematoma formation post-operatively with reduction of area of dysplasia on macroscopic examination. Six months post ablation, the patient was noted to have two new areas of dysplasia 8mm midline ventral tongue, 5mm left floor of mouth, and 5mm left retromolar triangle leukoplakic lesions. The patient underwent another ABC ablation of these areas and noted marked improvement in pain at the prior location of leukoplakia and improved tolerance to oral intake.

Case 2.
A 49 y.o. Caucasian woman with a history of T4aN2bM0 SCC of left oral tongue who had undergone partial glossectomy in April, 2009 who presented with a new area of irregular mucosa in the left retromolar triangle region with biopsy proven severe dysplasia. This 1cm dysplastic lesion was ablated in the operating room using the ABC as described above. This patient also tolerated oral intake immediately after in the recovery room without any evidence of adverse affect on swallowing or speaking when compared to the pre-operative evaluation. The patient was noted have good healing of the ablated site one week post-operatively.



Figure 1. Argon beam coagulator ConMed System 7550 with its hand piece bottom right corner.

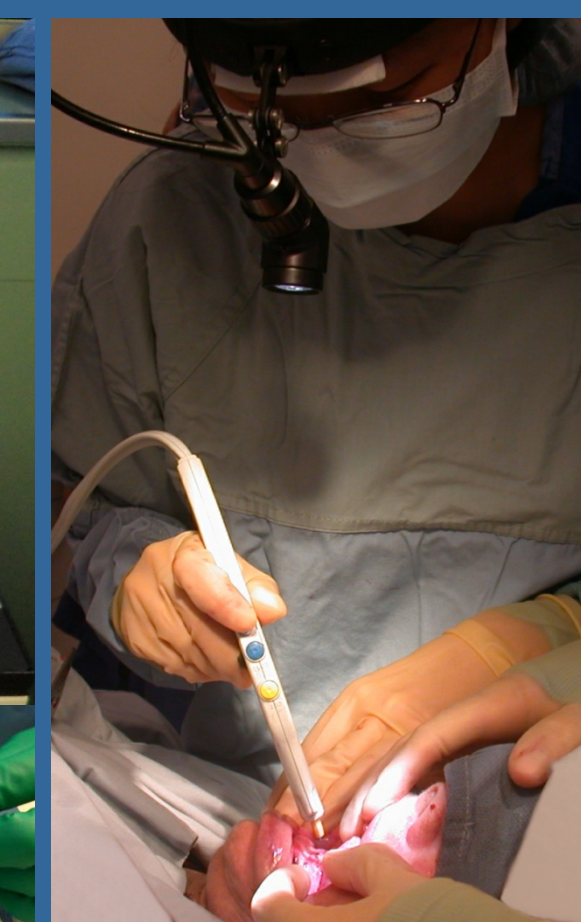


Figure 2. Intra-op use. No need for wet towels or special goggles, use similar to electrocautery by pressing the blue 'coag' button.

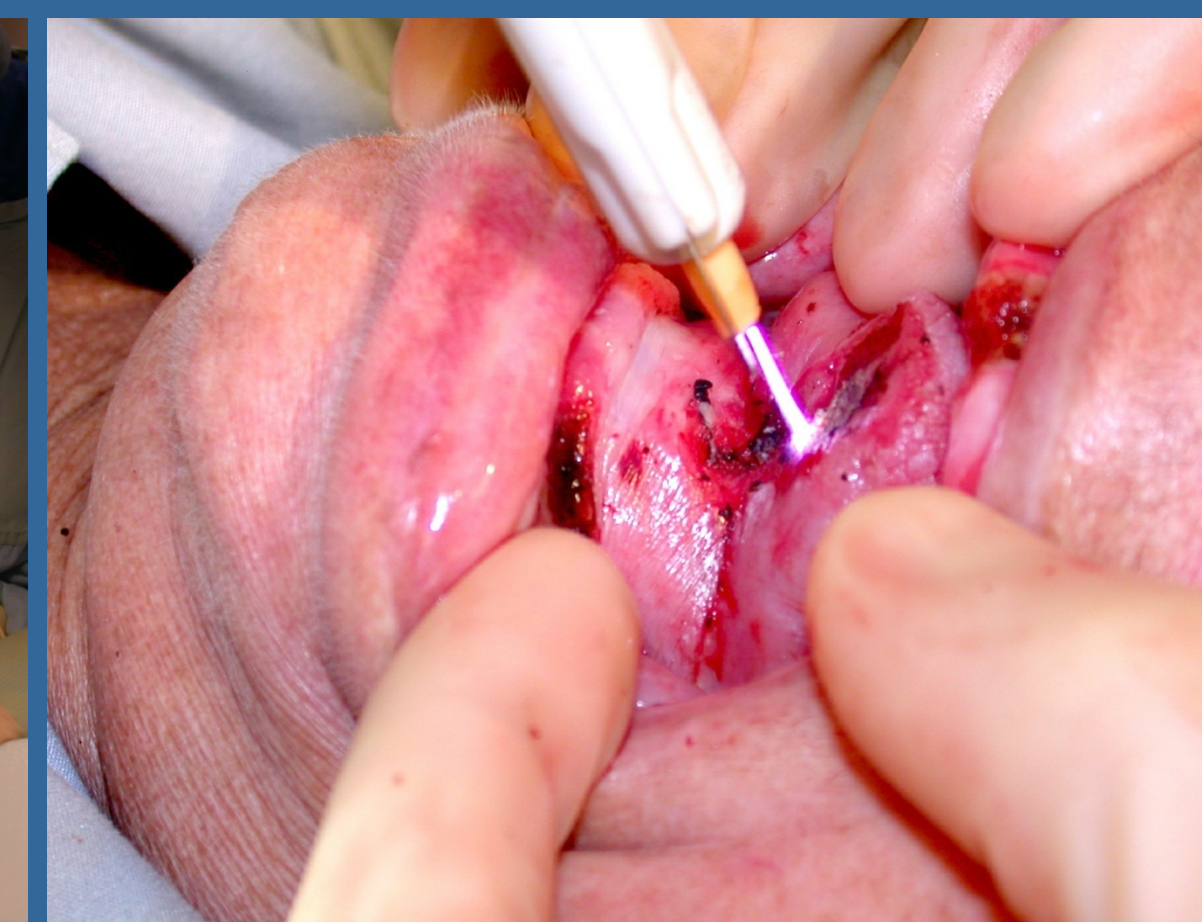


Figure 3. Argon beam coagulator in action. Ablation of dysplastic ventral tongue lesion.

RESULTS

Case 3.
A 68 y.o. Caucasian woman with a history of T2N1M0 SCC of the right lateral tongue s/p partial glossectomy in 2008 with field cancerization of the majority of the oral cavity who presented with painful leukoplakic lesions involving the ventral tongue, gingiva, and buccal mucosa in several areas. The patient had limited oral intake due to pain. A worrisome lesion of the ventral tongue was biopsied and returned dysplasia on path. This patient underwent ABC ablation of these leukoplakic lesions. Intra-operatively, due to the field cancerization, the entire oral cavity was affected with abnormal mucosa, therefore, some areas of dysplasia were not ablated unless definite leukoplakia was noted. The patient maintained her limited tolerance to oral intakes but noted improvement at some of the ablated sites where the patient had previously had severe pain upon contact with food. The patient denied difficulty with speech even after wide areas of ablation on the oral tongue and the surrounding subsites of the oral cavity and showed marked reduction of erythroplakia and leukoplakia.

All three patients with severe dysplastic lesions of the oral mucosa showed reduction of dysplasia, erythroplakia, and leukoplakia at the site of ablation using the ABC. All three patients were able to resume food intake by mouth immediately after surgery and showed competent level of swallow and speech on follow-up.

DISCUSSION

The argon beam coagulator is widely used in various surgical procedures and useful in laparoscopic procedures where hemostasis is essential.⁶ The use of the argon beam coagulator in the upper aerodigestive tract mucosa by otolaryngologists is seldom reported. In reviewing the three cases where the ABC was utilized for ablation of dysplastic lesions, all patients who underwent the ablative procedure were able to tolerate oral intake immediately after recovering from anesthesia and at times showed improvement in oral intakes on post-operative follow-up due to decrease in pain. The ABC has been effective in destroying premalignant lesions of the oral mucosa while preserving the patient's ability to speak, and preserving tongue mobility even in cases of field cancerization where multiple lesions were repeatedly ablated.

The ABC offers several advantages over the traditional CO2 laser when used in the operating room to ablate dysplastic oral mucosal lesions. Setting up the ABC is simple and uses less operative time when compared to using the CO2 laser.⁷ The reason for this is that the use of this device does not expose the surgeon or the operating room personnel to the added risk of injury to the eyes due to scattered laser beam or to fire when touching dry flammable surfaces. The arcing process of the argon beam provides an even distribution of the radio frequency energy which is easy to direct using the hand piece that closely resembles electrocautery. The stream of argon gas that is blown onto the targeted surface blows away any blood or debris, decreasing the amount of smoke produced and promoting effective coagulation.⁶ In particular, a slightly thicker beam provided by the ABC in comparison to the small focused beam of CO2 laser, allows the surgeon to address a wider area in a shorter amount of time when trying to ablate the same surface area. The ABC works instantaneous on the affected region and achieves coagulation of the edge of mucosa surrounding the dysplastic lesion undergoing ablation.

CONCLUSIONS

The addition of argon beam coagulator to otolaryngologists' armamentarium in mucosal resurfacing of the oral cavity enhances otolaryngologists' ability to address premalignant lesions of the oral cavity especially in patients with field cancerization where further aggressive surgical excision many deter good functional outcome in speech and swallowing. Mucosal resurfacing using the ABC provides a quick and safe new option toward treatment of dysplastic mucosa with a good functional outcome.

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