

# A Case of Recurrent Respiratory Papillomatosis Successfully Removed Via Endoscopic Argon Plasma Coagulation (APC) With No Evidence of Recurrence

Jyi Lin WONG, FRCP(Edin)\*; Siew Teck TIE, MRCP\*; Jun LEE, MRCP\*\*; S K KANNAN, MRCP\*\*\*; M R RASHID ALLI, MRCP\*\*\*; Arfian IBRAHIM, MRCP\*\*\*; Jamalul Azizi ABDUL RAHMAN, FCCP\*\*\*

\*Respiratory unit, Department of Medicine, Hospital Umum Sarawak, Malaysia, \*\*Department of Nephrology, Hospital Umum Sarawak Malaysia, \*\*\*Department of Respiratory Medicine, Hospital Queen Elizabeth, Sabah, Malaysia

## SUMMARY

Recurrent respiratory papillomatosis (RRP) is a benign disease caused by the human papilloma virus (HPV), characterized by the formation of recurrent, epithelial neoplastic lesions in the airways. While benign, they can cause significant airway obstruction in some cases. Difficulties in treatment arise from the recurrent nature of the lesions despite repeated procedures. Other known procedures that result in deep tissue damage also cause unacceptable collateral damage to the underlying airway mucosa. We describe a case of recurrent papillomatosis that was successfully treated with argon plasma coagulation (APC) when laser and electrocautery ablation had failed in the past. After the papillomatosis was treated with APC, there is no recurrence on repeat scope at 4 months and 9 months after the initial procedure. The procedure was done as a day case and there is no complication from the procedure. The property of the APC that allows it to cause only superficial thermal damage to the tissue makes it a suitable adjunct therapy to the treatment of papillomas, which are usually superficial lesions.

## KEY WORDS:

*Recurrent Respiratory Papillomatosis (RRP), Airway obstruction, Argon plasma Coagulation (APC)*

## INTRODUCTION

Recurrent respiratory papillomatosis (RRP) is a benign disease caused by the human papilloma virus (HPV), characterized by the formation of recurrent, epithelial neoplastic lesions in the airways. While benign, they can cause significant airway obstruction in some cases.

Traditionally surgical resection of the papilloma is the mainstay of treatment<sup>1</sup>. Endoscopy procedures using electrocautery, microdebriders, cryotherapy and Nd-YAG laser therapy has been used by the otolaryngologists. All these procedures, including surgical resection however have a major drawback- recurrence of the disease and transmission of the disease to other areas of the airway has been reported<sup>2</sup>. Inappropriate choice of power settings and time exposure or over aggressive use of the laser can also result in thermal damage to tissues that are deep or adjacent to the papilloma.

## CASE REPORT

We describe a case of RRP treated successfully with Argon Plasma Coagulation (APC) via flexible bronchoscope. The procedure is done by interventional pulmonologists.

A 47 years old Chinese man with a history of cadaveric right renal graft transplant in 2008 presented with one-day history of increasing dyspnoea, orthopnoea and productive cough in 2010. Patient's other past medical histories include diabetes mellitus, hypertension and bronchial asthma on inhalers.

Computed Tomography(CT) of the chest demonstrated a large endotracheal mass at the level of the carina, described as papillary-like, causing partial obstruction of right and left main bronchus. Flexible bronchoscopy showed a mass in the distal trachea over the posterior wall. CT angiography revealed a feeding vessel from the right bronchial artery. Biopsy of the lesion showed squamous epithelial papilloma with no atypical cells or malignancies seen.

Patient underwent bronchial artery embolisation and rigid bronchoscopy with laser debulking. The procedure was successful and the tumour was removed. But repeated bronchoscopy 4 months later showed recurrence of the disease and patient subsequent underwent another 2 rigid bronchoscopies and laser debulking. Patient's immunosuppressant was kept to the lowest tolerated dose of prednisolone 5mg a day, Cellcept (Mycophenolate mofetil) 750mg a day and FK506 (Tacrolimus) 1.5mg a day.

Two months after the third rigid laser debulking, patient again presented with coughing and shortness of breath and a flexible bronchoscopy performed at the time showed recurrence of the disease and a new smaller but similar lesion in the upper trachea. Patient subsequently underwent another 2 flexible bronchoscopy with forceps and electrocautery removal in the next 4 months, but each time the disease recurred.

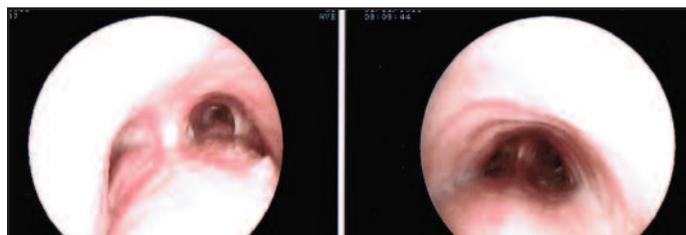
After some literature search<sup>3</sup> we decided to try Argon Plasma Coagulation(APC) in an attempt to cure the disease. Endobronchial APC was performed with an argon plasma coagulator unit (Söring ARCO 1000) via a flexible bronchoscope (Fujinon EB 270P). A 2.3-mm diameter, 220-cm length APC monopolar probe (Argo Flex Probe 600K003) was

*This article was accepted: 4 July 2014*

*Corresponding Author: Jyi Lin Wong, Respiratory Physician, Respiratory Unit, Department of Medicine, Hospital Umum Sarawak, Jalan Hospital, 93586 Kuching, Sarawak, Malaysia Email: wongjl@srwk.moh.gov.my*



**Fig. 1:** The appearance of the papilloma on bronchoscopy. A Laser therapy was initially used to remove the papilloma.



**Fig. 2:** The appearance of the trachea at 4 months and 9 months after APC. No recurrence of the disease detected.

\*These two figures are in colour, kindly access the colour photographs from the online version.

inserted through the working channel of the bronchoscope. The target tissue was endoscopically visualized and then coagulated. A flow of 0.4 l with energy of 20W was initially applied. The power of the APC was increased incrementally until meaningful devitalisation and coagulation of the lesion was seen. A maximum energy of 40W was used in our case. The devitalized tissue was then mechanically removed with grasping forceps. The steps were repeated until healthy mucosa tissue was seen (bleeding noted). Once the lesion was completely removed, the energy was then turned back to 20W and the base of the lesion devitalized. The first session of APC was performed on the upper lesion which was a smaller lesion. We tried to treat the upper lesion first to avoid further contamination of the scope. The lower lesion was just removed with a Electrocautery wire in the first session. A repeat scope one month later showed the recurrence of the lower lesion but the upper lesion was clear. So repeat APC was done to the lower lesion this time and the whole procedure was done under local anaesthesia and lasted 30 minutes.

Repeat bronchoscopy 4 months and then 9 months later showed that the disease had not recurred and patient remains asymptomatic.

**DISCUSSION**

The true incidence of recurrent respiratory papilloma is unknown. Using viral probes, HPV 6 and 11 has been established as the main causative agent. The goal of treating RRP is to remove as much disease as possible to improve or maintain respiratory function, while preventing recurrence of the disease. However RRP has proven to be a chronic disease. So far, none of the surgical or endoscopic procedure was found to be satisfactory in eradicating the disease. Patients generally undergo multiple procedures to control disease. Adjuvant therapy using anti Viral and interferon injection has been described to be useful<sup>4</sup>.

Argon Plasma coagulation, which uses a high-frequency electrical current fed from a probe tip through ionized argon

plasma is useful in causing superficial thermal coagulation of tissue. The advantage of APC includes its ability to be used via a flexible bronchoscope, as well as its ease of use and safety. Tissue contact with the probe is not required in order to achieve a predictable and reproducible penetration depth of 2 to 3 mm. Because argon coagulation is dependent on the water content of the targeted tissue, desiccation of the treated area prevents deeper thermal effect and damage to underlying structures. Argon coagulation does not result in tissue carbonization or vaporization. This is ideal for a papilloma which is a superficial epithelial tumour.

The successful usage of APC for papilloma was first reported by Bergler *et al* in 1997<sup>5</sup>. Since then, there had been a few reports of successful treatment of papilloma using APC. It offers the simplicity and low cost of an electrocoagulator with the non contact approach of an Nd-YAG laser. In our case, we have successfully kept the patient disease free for 9 months using APC, which previous attempt using laser and electrocautery had failed.

**CONCLUSION**

APC can be a useful adjunct to the treatment of respiratory papillomas due to its unique ability to cause superficial thermal coagulation and devitalisation of the mucosa.

**REFERENCES**

1. Aylward TD, Flege JB. Primary papilloma of the trachea. *Ann Thorac Surg.* 1973; 16(6): 620-3.
2. Derkay CS, Wiatrak B. Recurrent respiratory papillomatosis: a review. *Laryngoscope.* 2008; 118(7): 1236-47.
3. Keller CA, Hinerman R, Singh A, Alvarex F. The use of endoscopic argon plasma coagulation in airway complications after solid organ transplantation. *Chest.* 2001; 119(6): 1968-75.
4. Armbruster C, Kreuzer A, Vorbach H, Huber M, Armbruster C. Successful treatment of severe respiratory papillomatosis with intravenous cidofocir and intereferon 2b. *Eur Respir J.* 2001; 17(4): 830-1.
5. Bergler W, Hönig M, Götte K, Petroianu G, Hörmann K. Treatment of recurrent respiratory papillomatosis with argon plasma coagulation. *J Laryngol Otol.* 1997; 111(4): 381-4.