An Experimental Study Comparing Collateral Tissue Destruction with The Harmonic Scalpel vs The Coblator Wand – How Does This Affect Tumour Resection Margins?

Thiru Siva, FRCS (ORL-HNS)¹; Samuel MacKeith, MRCS DOHNS¹; Paul Gurr, FRCS (ORL-HNS)²
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INTRODUCTION

Surgery is one of the principal treatment modalities in the management of head and neck cancer. Curative, oncological surgery requires complete excision of the cancer with an adequate margin. A compromise must be reached between effective cancer excision and preservation of normal structures. As a result, the oncologist has the major role in determining the need for postoperative radiotherapy.

More recently, the use of ultrasonic energy with the Harmonic scalpel and radiofrequency energy with Coblation have gained popularity in head and neck cancer. The Harmonic scalpel (to reduce lateral thermal tissue damage) but also able to coagulate vessels up to 5mm, as well as being intended for use as a grasper and dissector. More recently, the use of ultrasonic energy with the Harmonic scalpel and radiofrequency energy with Coblation have gained popularity in head and neck cancer. The Harmonic scalpel (to reduce lateral thermal tissue damage) but also able to coagulate vessels up to 5mm, as well as being intended for use as a grasper and dissector. The measurements taken for the control technique with the steel scalpel were slightly wider than those used for harmonic excision but this apparent tiny increase in the length of the tissue measured. This may be due to the increased thickness of the tissue and was not taken into account in our measuring technique. Using the Harmonic scalpel with the tongue tissue under dissection tension is shown to dramatically reduce tissue destruction but in the in vivo setting is likely to be associated with loss of the haemostatic advantage of this technique.

METHODS AND MATERIALS

METHODS

New technologies are introduced with the aim of helping clinicians to achieve complete excision of the cancer with an adequate margin. The Harmonic scalpel and electrocautery were developed in the 1970's, have gained popularity in the oncological setting as to whether to give post operative radiotherapy or not. This adjustment in the excision margin measurement may mean a true 3.0mm margin of tissue may have been destroyed (using Harmonic scalpel or Coblator wand respectively) meaning a true excision margin of 3.0mm or 3.5mm. This difference may well affect the decision made between defined parallel lines with each dissection technique. The residual tissue width was measured with vernier calipers.

RESULTS

The Tongue has the advantage of having a relatively homogenous tissue destruction for each modality was as follows:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Tissue loss (mm)</th>
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<tr>
<td>Control (cold steel scalpel)</td>
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DISCUSSION

Tissue loss (mm)

Our results show that compared to cold steel dissection, there is a significant amount of tissue loss when cutting through tissue with the Harmonic Scalpel and Coblator wand, 3.0mm and 3.5mm respectively. This difference may well affect the decision made between defined parallel lines with each dissection technique. The residual tissue width was measured with vernier calipers.

CONCLUSIONS

The use of these techniques should be evaluated for their efficacy and potential adverse effects when used in oncological surgery. This study uses an animal model to demonstrate the tissue destruction produced when using the Harmonic scalpel and Coblator wand when compared to cold steel dissection. Future studies will be needed to confirm these results have on tumor board discussions and decisions caused by difficulty in the interpretation of close excision margins. The findings of this study should be borne in mind when using the Harmonic scalpel and Coblation in head and neck surgery.

REFERENCES

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ABSTRACT

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