

Peer Review File

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Reviewer A

This is an interesting and informative article on the use of laryngeal EMG in the intraoperative setting on pediatric patients with VC immobility. I only have a few comments and suggestions:

Correction 1 st page line 13: Hospotal to Hospita

Response: This has been changed in the text.

Would you be able to include the electrode readings, or an example of the electrode readings of a normally functioning VC vs. a palsy vs paresis or CAJ, in both the TA and PCA muscles?

This has been included as a table and figure form (table 1, figure 2)

Would you be able to discuss a bit more in detail, the use of laryngeal EMG and the advantages of it detecting other causes of VC immobility: e.g. for prognostication based on electrical readings of a palsy vs paresis as well as comparison of the different types of electrical activity of palsy vs paresis vs CAJ fixation? Would you be able to comment on how laryngeal EMG can be used to guide prognosis of return of function or potential of some return of movement?

Response: CAJ fixation is diagnosed when there is normal LEMG activity in the setting of an immobile cord on flexible nasendoscopy. Intra-operative palpation of the CAJ is also diagnostic. Paralysis ie palsy is when there is no activity at all, whereas paresis the waveform is reduced. If paresis is recorded this may suggest a better overall prognosis vs someone who has no activity in the recordings. However, it is important to consider serial LEMG in some cases.

Therefore the following statement has been added to the paper.

Laryngeal EMG is used as an extension of clinical examination and not in isolation. On insertion of the needle into the laryngeal muscles we can get an idea of the insertional activity which will be reduced or lost in an atrophic muscle. If there are active denervation changes seen on the EMG it suggests damage to the nerve supply and helps in determining the stage of nerve damage and the degree of nerve damage. Procedures for reconstruction should take into consideration the degree

of atrophy of the laryngeal muscles. CAJ fixation can be diagnosed in the setting of a normal LEMG activity in an immobile cord on flexible nasendoscopy. Intra-operative palpation of the CAJ is also diagnostic.

The EMG is most useful in unilateral VC palsy as we can compare the waveforms with the unaffected side. However, it is important to consider serial LEMG in some cases.

Reviewer B

Laryngeal emg has been advocated to assist in management of paediatric vocal cord paresis. In Australia the use is often limited to the research setting with access to appropriate electrodes and physiologists/ neurologists with adequate training to interpret results being limited. Little standardisation exists with regards to equipment and interpretation of results.

In the paediatric setting these recordings are performed under anaesthesia and given the size of the infant larynx finding appropriate electrodes can be challenging. Other authors have offered solutions; (Bowe SN, Wentland CJ, Hartnick CJ. Pediatric laryngeal electromyography technique for vocal fold immobility using bipolar double hookwire electrodes. International journal of pediatric otorhinolaryngology. 2019;119:75-78)

In this How I Do it paper, these authors describe a modified electrode technique.

They however provide no insights into the accuracy or results obtained using such technique. An example of a case in which this technique was used may provide the reader with a better understanding of the utility.

It would be useful to know if the author is performing this to assist clinical decision making and what role it has in their centre to date.

Response: Current role in the centre is adjunct to other established procedure including diagnostic laryngotracheal bronchoscopy, amongst others. It is also to guide definitive management for instance prior to recurrent laryngeal nerve reinnervation, as well as prognostication. Serial LEMG is performed to ensure that there is no recovery over the observation period to guide discussion with parents.

The following statement has been added in the paper:

The current role in our unit is adjunct to other established procedures including diagnostic laryngotracheal bronchoscopy, amongst others. It also has a role to play to guide definitive management for instance in the setting of recurrent laryngeal nerve re-innervation, as well is a role in prognostication. Serial LEMG is performed to ensure there is no recovery over the observation period to guide discussion with parents.

For those less familiar with laryngeal emg it may be useful to provide examples of the expected emg results from normal and abnormal readings. Could this be provided as a video file?

In the revised paper, this has been provided in table and figure form.

Perhaps the photo could also include what the electrode looks like before modification?

Response: figure 1 has been altered to reflect this recommendation

The introduction should provide more information as to the role of EMG in the paediatric setting. (reference for line 36).

The following comment has been added:

Response: Its main function is in the assessment of patients with laryngeal motility disorders including unilateral or bilateral vocal cord immobility.

Why is it useful and what are the expected outcomes of measuring these potentials?

Response: in response to other recommendations made the following statements have been added to the paper:

The current role in our unit is adjunct to other established procedures including diagnostic laryngotracheal bronchoscopy, amongst others. It also has a role to play to guide definitive management for instance in the setting of recurrent laryngeal nerve re-innervation, as well is a role in prognostication. Serial LEMG is performed to ensure there is no recovery over the observation period to guide discussion with parents. Line 111 - 115

Laryngeal EMG is used as an extension of clinical examination and not in isolation. On insertion of the needle into the laryngeal muscles we can get an idea of the insertional activity which will be reduced or lost in an atrophic muscle. If there are active denervation changes seen on the EMG it suggests damage to the nerve supply and helps in determining the stage of nerve damage and the degree of nerve damage. Procedures for reconstruction should take into consideration the degree of atrophy of the laryngeal muscles. CAJ fixation can be diagnosed in the setting of s normal LEMG activity in an immobile cord on flexible nasendoscopy. Intra-operative palpation of the CAJ is also diagnostic.

The EMG is most useful in unilateral VC palsy as we can compare the waveforms with the unaffected side. However, it is important to consider serial LEMG in some cases.

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The references should include a recent review which interested readers could be directed to for further information in regards to the usefulness of this paediatric LEMG.

No reference eg brand for the grounding electrode (line47) - **has been added**

Line 42 - this isn't a study. Descriptive paper only - Speciality Technique

Response: This has been changed to reflect this.

In the paragraph describing LEMG technique, does the author monitor during specific part of the respiratory cycle or lighten the anaesthetic to better access muscle activity? Some authors advocate recording the potentials as the patient emerges out of anaesthetic rather than under GA. Does the author have any experience in regards to the accuracy of the results achieved using their technique?

Response: It is not our practice to monitor the intercostals for the specific part of the respiratory cycle as it is currently not felt that this provides additional information. The patient is spontaneously breathing throughout the assessment and we aim to not alter the anaesthetic or take recordings as the patient emerges so as to not risk excessive movement causing displacement of the electrode needle and subsequent trauma to the vocal folds.

A statement to that affect has been added to the how we do it segment of the paper.