To observe the correlation between train-of four count and diaphragmatic thickness fraction in myasthenia gravis patients undergoing minimally invasive thymectomy

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Myasthenia and Minimally invasive thymectomy

- Myasthenia: Neuromuscular weakness
- Myasthenia: 85% associated with thymic abnormality
- Management: Minimally invasive thymectomy
- Use of muscle relaxants for DLT and OLV
- Sensitive to muscle relaxants: difficult extubation

Myasthenia and Neuromuscular monitoring

- TOF : Gold standard for neuromuscular monitoring
- EMG cumbersome and not easily available
- USG: good alternative diagnostic tool
- No study in OT settings

Diaphragmatic thickness fraction and ICU

- Used in ICU for weaning.
- Change of DTF 28% to 96% in healthy volunteers and -35% to 5% in paralysed diaphragm1
- DTF>36% associated with successful SBT2
- Diaphragm thickening a reliable indicator of respiratory effort

1 Sarwal A et al ; muscle Nerve 2013
2 Ferrari G et al; crit ultrasound journal 2014
3 Umbrello M et al;critical care journal;2014

Calculation of DTF

Inspiratory DT

- Sandwiched between pleura and peritoneum

Expiratory DT

Aims and objectives

- To find out the correlation between train-of-four count and Diaphragmatic thickness fraction in Myasthenia Gravis patients undergoing minimally invasive thymectomy

Primary objective:

- Correlation between TOF and DTF: To find out whether DTF can be used as an aid for extubation in operation theatre setting in Myasthenia Gravis Patients.

Methodology

Inclusion Criteria

- ASA grade I/II/III.
- Age : 16 to 70yrs
- Patients of Myasthenia gravis undergoing elective minimally invasive thymectomy.

Exclusion Criteria

- Patient refusal
- Patients with diaphragmatic palsy due to other comorbid conditions.

Statistical analysis

- SPSS Strata 14.0
- Categorical data: chi-squared(Fischer Exact test)
- Statistical relationship between two groups: Mann-Whitney U test
- Qualitative score : Kruskal Wallis H test followed by Dunn test
- Spearman correlation coefficient : quantitative variables
- p<0.05: statistically significant.

Observation and Results

Demographic data

	Mean	±SD
Age (year)	37.35	±14.34
Height (cms)	158.35	±5.95
Weight (kg)	57.4	±9.62
BMI (kg/m²)	22.78	±2.74
Duration (year)	1.67	±1.62

Preoperative Diaphragmatic thickness fraction

For the sample size of 20 patients mean preoperative Diaphragmatic thickness fraction was found to be 52.4 ± 17.3 % with a median of 57.3% ranging from 28 to 80%.

DTF at various time points

Preop DTF		Mean ± SD				
		52.4± 17.3				
DTF1	DTF2	DTF3	DTFext	DTF1-2	DTF2-3	DTF3-ext
MEAN±SD	MEAN±SD	MEAN±SD	MEAN±SD	pvalue	pvalue	pvalue
17.7±11.7	30.4±17.4	48.64±20.9	55.62±22.5	0.003	0.001	0.0008

Figure. DTF with time after reversal of neuromuscular blockade.

Correlation of TOF count with DTF and clinical parameters on extubation

Parameter	TOFcount 3	TOF count 4	P value
	Mean± SD	Mean± SD	
DTFext	52.4± 24.88	55.62± 22.51	0.6308
RRExt	22± 8.21	17.2± 5.466	0.2053
TVext	540.8± 86.20	485.66± 78.83	0.4038

Correlation of TOF COUNT with DTF and other clinical parameters

DTF at extubation

Conclusion

- DTF of more than 28% is an index of neuromuscular recovery and may assist in tracheal extubation at the end of surgery.
- DTF was not found to correlate with TOF Count and clinical parameters.
- Further studies needed to find the role of DTF in the assessment of neuromuscular recovery and whether it can be used as a routine monitoring during extubation

Limitations of study

- Sample size small
- Observations are subjected to variations.
  - ✓ Placement of probe difficult during extubation.
  - ✓ Variations in tidal volume in response to bucking coughing and extubation response.
- Observational study.