Effect of percutaneous Tracheostomy on Intracerebral Pressure and perfusion pressure in patients with acute cerebral dysfunction (TIP Trial)

- An observational study -

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Abstract

Objective: Bedside percutaneous tracheostomy is very commonly used for patients who require prolonged mechanical ventilation. The effect of tracheostomy on intracranial pressure (ICP) is currently a subject of controversy. The aim of our study is to clarify the relation between percutaneous tracheostomy and its effect on intracranial pressure and cerebral perfusion pressure.

Methods: 38 patients on our intensive care unit were included prospectively in an observational study. We examined mean values of HF, SpO_2, ICP, CPP, and MAP for changes over five different phases of the procedure using paired Mann-Whitney U tests. A p value of $p<0.05$ was considered significant. P-values were Bonferroni corrected for multiple testing.

Results: Percutaneous tracheostomy was performed on 38 patients (f=19, m=19; mean= 56years). Median ICP before intervention was 9mmHg. During positioning of the patient, ICP had risen to 14, during bronchoscopy to 16, and during tracheostomy to 18mmHg, all being significantly higher than baseline level. Monitoring of MAP showed a significant increase to 101mmHg only during tracheostomy. SpO_2 and HF did not show any significant changes. Mean duration of positioning, bronchoscopy and tracheostomy was 19, 10, and 17minutes. 8 patients received osmotherapy due to a rise of ICP of more than 30mmHg.

Conclusion: Percutaneous tracheostomy only leads to a significant rise of ICP during the procedure. Nevertheless, therapy of ICP is necessary in some patients. From our point of view, therefore, tracheostomy should only be performed under continuous monitoring of ICP and CPP in patients with severe cerebral dysfunctions and critically elevated ICP.

Key-words:
Acute cerebral dysfunction — Cerebral perfusion pressure — Intracranial pressure — Percutaneous tracheostomy