Tracheostomies and Stroke

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Abstract:
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- Thirteen of 25 stroke patients with tracheostomies died in the hospital. Of the 12 survivors, eight died within two and one-half months after discharge and one lived six months. All nine that died after discharge required continuous nursing home care. One survivor still required total nursing care three and one-half years later and two patients made a good recovery. All three patients living longer than six months following discharge had pontine lesions. There was no difference in the fate of patients with thrombotic or hemorrhagic strokes. Tracheostomies are of questionable value in stroke patients except possibly in those with brain stem lesions.

Additional Key Words
- prognosis
- hemorrhage
- pontine lesions
- thrombosis

Introduction

- Tracheostomy, one of the oldest surgical procedures, has been known for hundreds of years. Archeological evidence indicates that the early Egyptians may have been aware of this technique. However, Galen's writings from the second century A.D. gave credit for the first operation to the Greek surgeon Asclepiades, who lived about 124 B.C. However, the procedure was infrequently and only heroically resorted to until the twentieth century. Indeed it is only within the last two decades that tracheostomy has become a widely accepted surgical procedure to be done not merely on an emergency basis but as an elective adjunct to better patient management. Whereas previously the vast majority of tracheostomies were performed for upper airway obstruction, the trend has changed to the increasing use of the technique in nonobstructive respiratory insufficiency, namely, that caused by retention of secretions or central nervous system depression. The majority of acutely ill stroke patients experience some degree of ventilatory insufficiency. Although a large number of these must have had tracheostomies, in the past several years published data concerning tracheostomies and strokes are scarce.

Beatrous reviewed 1,000 consecutive tracheostomies performed in two New Orleans hospitals. Slightly over one-half of the patients died. In this study were included 150 stroke patients with 120 deaths, or 80% mortality. Kier and Roemer had 62 stroke patients in their report of 411 tracheostomies on a neurosurgical service with an overall mortality rate of 46%. The number of deaths for the stroke group was not given.

Dugan and Samson, in a study of 461 patients with tracheostomies, reported an overall mortality rate of 48%. In this series there were 68 cases of "unconsciousness," some but not all of which were diagnosed as stroke. The death rate of this smaller group was 74%. These reports indicate that there exists an expected higher mortality in the stroke group.

Rohr followed 11 patients with tracheostomies and brain stem involvement due to skull fracture, tumors, and one case of vertebral artery thrombosis. Postmortem studies in the eight fatalities showed that in some cases pulmonary disease seemed to be the cause of death, while in others disturbance of the central respiratory center was fatal.

The literature does not reveal any long-term follow-up of stroke patients with tracheostomies. Nor are there any published data found on the type or location of the cerebral lesion in those patients requiring tracheostomies.

Methods

This report on a small number of stroke patients with tracheostomies was undertaken in an attempt to help clarify the status of this operative technique. A total of 25 stroke patients had tracheostomies during the period from October, 1967, to April, 1972, while hospitalized on the Mississippi Regional Medical Program Stroke Unit at the University of Mississippi Regional Center, Jackson, Mississippi. If it was anticipated that a patient would have respiratory difficulty for longer than three days, a tracheostomy was performed routinely rather than the insertion of an endotracheal tube. Follow-up information was obtained from various sources. Cases were evaluated for the type and site of cerebral lesion and the possible effect of these factors on survival time. No effort was made to determine which patients were mechanically ventilated.
Results
Of the 25 patients who had tracheostomies, 13 died in the hospital and 12 were discharged. The total duration of hospitalization varied from two days to three months. The fate of the 12 survivors was examined in order to learn their long-term survival rate and functional capacity (table 1). Ten patients were discharged to nursing homes, one was sent to his local hospital, and one went home. Eight of the 12 who left the hospital died in nursing homes within two and one-half months, with an average survival time of one month (three days to two and one-half months). One 50-year-old woman with subarachnoid hemorrhage secondary to aneurysm, who was discharged to a nursing home, required total nursing care until her death six months later. A 38-year-old man with bilateral pontine infarction was living in a nursing home three and one-half years after discharge. Although he was alert, he had spastic quadriplegia and marked difficulty in communication. Only two of the 25 patients made a satisfactory recovery. One was a 67-year-old woman with a diagnosis of pontine hemorrhage who was ambulatory and living at home until four years later when she was placed in an extended-care facility because of a chronic brain syndrome. The other was a 66-year-old woman who probably had a small pontine hemorrhage (no lumbar puncture was done). She was discharged directly home from the hospital neurologically intact and was doing well three years later. The three survivors who lived more than six months after discharge all had pontine lesions.

A comparison also was made between those who had a clear cerebrospinal fluid (CSF) with a diagnosis of infarction and those who had a bloody CSF with a diagnosis of subarachnoid hemorrhage secondary to aneurysm or intracerebral hemorrhage. Ten of the 25 patients had bloody CSF and six of these died during hospitalization. There were 14 patients with clear CSF, seven of whom expired in the hospital. The one patient who did not have a lumbar puncture was thought to have an infarct. The prognosis was equally poor for survivors with hemorrhage or infarction. Four of ten patients with hemorrhage left the hospital. Two of these survived two and one-half months and a third lived six months. All required nursing home care from the time of discharge to death. One made a good recovery. Eight of the 15 with infarction lived to be discharged. Of these, six died within three months. One required total nursing care three and one-half years later and one made an excellent recovery.

Comments
Although this is a small series with no control group, it is apparent that these 25 stroke patients with tracheostomies did not fare well. There was only a 52% mortality during hospitalization which rose to a staggering death rate of 84% at three months and 88% at six months following discharge. The remaining survivors (12%) all had brain stem strokes.

From this limited study it might be concluded that careful consideration should be given before performing tracheostomies on stroke patients, especially those with hemispheric lesions. Patients with lesions of the brain stem, either thrombotic or hemorrhagic, might be more suitable candidates for this procedure.

References
2. Beatrous WP: Tracheostomy (tracheotomy)—its expanded indications and its present status. Based on an analysis of 1,000 consecutive operations and a review of the recent literature. Laryngoscope 78: 3-55, 1968

<table>
<thead>
<tr>
<th>Fate of patients</th>
<th>Site of cerebral lesion</th>
<th>Type of stroke</th>
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<tbody>
<tr>
<td></td>
<td>Brain stem</td>
<td>Hemispheric</td>
</tr>
<tr>
<td>Expired in hospital</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Expired within 2 1/2 months after discharge</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Expired 6 months after discharge</td>
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<td>1</td>
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<tr>
<td>Total nursing care required</td>
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<td>0</td>
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<tr>
<td>3 1/2 years after discharge</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
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<td>14</td>
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