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Influences of Hypoglossus and Glossopharingeus Nerves on the Larynx Resistance

Changes in larynx resistance induced by mechanical stimulation of the high respiratory airways epithelium had been already reported (2, 3, 5-7) and also those due to vagal fibres electrical stimulation (4). It had been proposed that bronchial constriction, mediated by a reflex mechanism changes the laringeal sphinter resistance (3, 4). The present study was designed to contribute with new data concerning to the functional role of other cranial nerves in the control of the glottis closed and opening. Respiratory effects and the modifications in larynx resistance obtained after hypoglossus and glossopharingeus nerves section and during electrical stimulation of the central and peripheral ends have been studied.

Experiments were carried out in seven dogs using the *in situ* isolated glottis technique described elsewhere (1-7). The right hypoglossus nerve was dissected free and sectioned in the highest zone of the superior carotideus triangle immediately below digastricus muscle posterior venter. Section effects were studied as well as those obtained by central end electrical stimulation. After fifteen minutes, glossopharingeus nerve was dissected free and sectioned at the external superior cervical triangle level. Section and central end electrical stimulation effects were studied too. Electrical stimulation parameters were of 20 V and 300 μs duration at a frecuency 10 Hz. The period of stimulation was of 60 s.

The hypoglossus section produced an increase in: *a*) Inspiratory and expiratory larynx resistance. *b*) Maximum inspiratory air flow ($0.02 > P > 0.01$). *c*) Maxi-

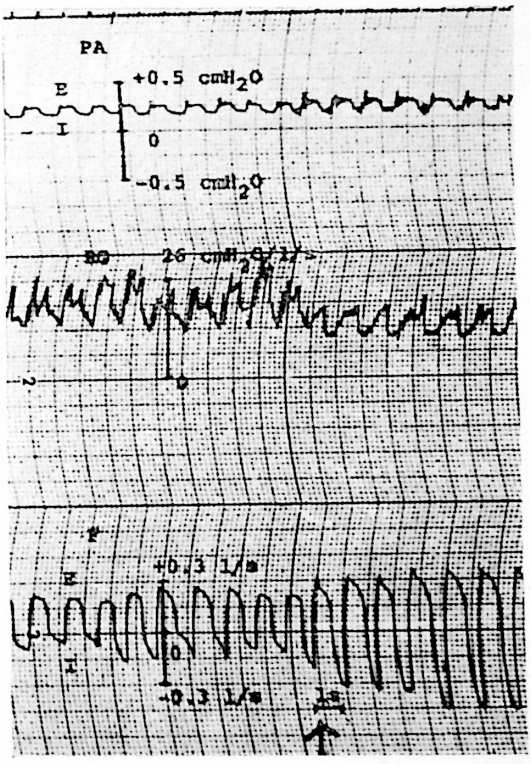

Fig. 1. *Records of hypoglossus central end electrical stimulation.*
From the top, the traces are: abdominal pressure, larynx resistance and pneumotacogram. The start of stimuli at the arrow.

mum expiratory air flow ($0.01 > P > 0.001$). *d*) Expiratory abdominal pressure ($0.02 > P > 0.01$).

The hypoglossus central end electrical stimulation produced the following results (figure 1): *a*) A decrease in the larynx resistance ($0.01 > P > 0.001$). *b*) An increase in: Respiratory rate ($0.05 > P > 0.02$), expiratory abdominal pressure ($P < 0.001$), inspiratory and expiratory pleural pressures ($0.01 > P > 0.001$).

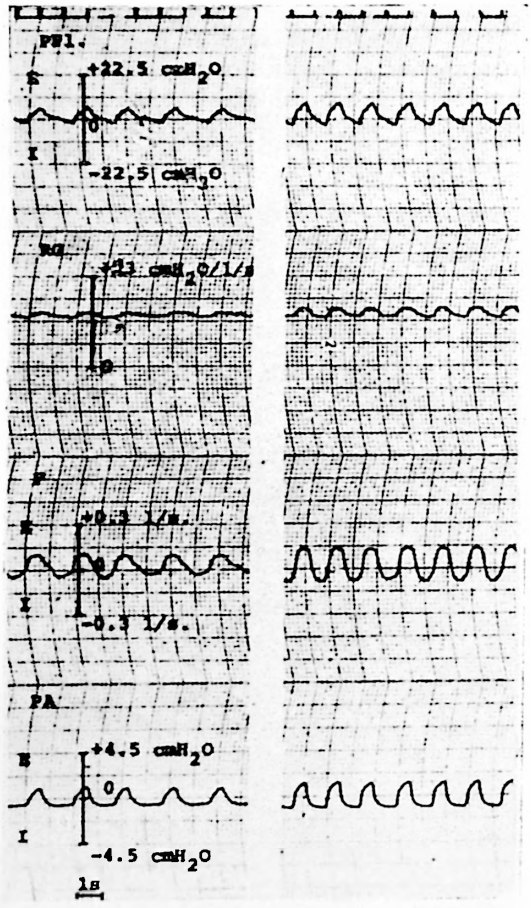

Fig. 2. *Records of glossopharingeus central end electrical stimulation.*
From the top, the traces are: pleural pressure, larynx resistance, pneumotacogram and abdominal pressure. Before (left-hand column) and during (right-hand column) electrical stimulation.

The glossopharingeus section produced a few significative modifications: Expiratory abdominal pressure ($0.05 > P > 0.02$) and expiratory pleural pressure ($0.01 > P > 0.001$) increase.

The glossopharingeus central end electrical stimulation produced (fig. 2): An increase in larynx resistance expiratory-inspiratory differential value ($0.01 > P > 0.001$) mainly due to expiratory resistance increase ($0.02 > P > 0.01$). Sometimes closes of the glottis were observed during electrical stimulation. An increase in respiratory rate ($0.02 > P > 0.01$), maximum inspiratory air flow ($0.01 > P > 0.001$), expiratory abdominal pressure ($P < 0.001$) and in pleural pressures.

These results suggest that there are probably hypoglossus fibres that would exert a dilatation effect on the glottis in the two phases of the respiratory cycle, though we cann't reject the indirect effect that modification in the contraction of tongue muscles would exert on glottis resistance. Glossopharigeus central end electrical stimulation shows a larynx resistance increase mainly expiratory, with expiratory-inspiratory differential resistance increase. These results are in opposition of those observed in hypoglossus central end electrical stimulation. Therefore it may be suggested that there are probably afferent fibres in both nerves which have different functions in laryngeal sphinter control.

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S. GONZÁLEZ-BARÓN, M. MOLINA,
F. GARCÍA-MATILLA and A. BOGAS

Departamento de Fisiología
Facultad de Medicina
Universidad de Sevilla

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