
Effect of Percutaneous Cervical Cordotomy on Somatosensory Thresholds in Man: A Quantitative Study

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Phil. Trans. R. Soc. Lond. B 1985 **308**, 423

doi: 10.1098/rstb.1985.0057

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17. Effect of percutaneous cervical cordotomy on somatosensory thresholds in man:
a quantitative study

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The functional role of afferent axons ascending in the anterolateral quadrant of the spinal cord in the transmission of pain and temperature is well established in man. Also, experimental data and clinical observations indicate that some mechanical information is relayed through fibres located in the anterolateral white matter.

The effect of the lesion of the anterolateral funiculus on somatosensory thresholds was investigated in 12 patients who underwent unilateral percutaneous cervical (C₁–C₂) cordotomy for the relief of pain due to cancer. All patients were receiving opiates pre-operatively. The operation produced complete pain relief in 11 patients; in the remaining one it did not have any analgesic effect. Pin-prick analgesia contralateral to the lesion extended to upper cervical dermatomes in only five cases. In one patient no skin pin-prick analgesia was produced, despite complete pain relief. Each patient was tested before (1.1 ± 0.8 days) and after (5.0 ± 1.1 days) cordotomy at standard points on the hand and foot on both sides of the body. The following parameters were determined: (a) two-point discrimination distance (centimetres); (b) tactile threshold (milligrams); (c) vibration (100 Hz) threshold (micrometres); (d) pressure pain threshold (kilograms); (e) warmth and cool sensation thresholds (degrees Celsius); (f) hot and cold pain thresholds (degrees Celsius); and (g) skin temperature (degrees Celsius). The results were analysed by paired *t* tests to determine statistically significant ($p < 0.05$) differences after cordotomy.

On the ipsilateral (with respect to the spinal cord lesion) foot an increase of temperature was observed (pre-operatively: 30.2 ± 0.7 °C; post-operatively 30.9 ± 1.2 °C). On the contralateral hand significant increases of the vibration, pressure pain, warmth and cool sensation thresholds were noted. On the contralateral foot, pressure pain, warmth and cool sensations, hot pain and cold pain thresholds were significantly increased after cordotomy.

Our results confirm the well known contralateral deficit of cutaneous mechanical and thermal pain and thermal sensation that follows a lesion of the spinal anterolateral quadrant. There is also evidence for an ipsilateral sympathetic efferent dysfunction in the increased skin temperature. Although no significant alterations of two-point discrimination or tactile thresholds were observed in any of the tested areas, the finding of an increased vibratory threshold in the contralateral hand after cervical cordotomy might reveal damage to a crossed mechanosensitive pathway located in the anterolateral funiculus of man.