Evoked Photic Responses from the Human Thalamus and Midbrain

W.P.		Wilson
B.S.		Nashold

Duke Medical Center, Durham, N.C.

Abstract

Investigation of specific afferent pathways has demonstrated that collateral and direct pathways convey sensory information to a variety of nuclear structures in the mesencephalon and diencephalon. Direct visual inputs to the tegmentum, pretectum, median pulvinar, lateral geniculate nuclei and superior colliculi have been demonstrated. Nashold recently reported the activation of visual phosphenes in an alert human during subcollicular stimulation. This report concerns the recording of photic evoked responses from the thalamus and midbrain in awake humans undergoing stereotactic surgery for relief of intractable pain. A group of 13 patients was studied, and recordings were made from chronic depth electrodes implanted in the site for the production of the lesion. The results indicate that consistent photic evoked responses could be recorded from the medial pulvinar, medial tegmentum and superior colliculus. These were all short-latency-evoked responses to the visual stimulation. No latencies exceeded 200 msec. Occasional low voltage evoked potentials were recorded from the dorsolateral tegmentum, the lateral pulvinar and the substantia nigra. All responses observed were at flash frequency and no harmonic response occurred. Tegmental responses were attenuated but not abolished when the eyes were opened. Direct stimulation from the areas from which the visually evoked responses occurred resulted in multisensory and motor and autonomic effects. These results support the idea of multisensory inputs to the medial pulvinar and upper midbrain.

¹ For complete text see: WILSON, W. P. and NASHOLD, B. S., jr.: Evoked photic responses from the human thalamus and midbrain. Confin. neurol. 35: 338–345 (1973).
164 WILSON/NASHOLD (324)