

Title: EFFECT OF SYMPATHETIC BLOCKADE ON TACTILE SENSITIVITY

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Introduction. A prominent feature of the pain relieved by sympathetic blocks is the extreme sensitivity to mechanical stimulation.^{1,2} Since the relief of pain in causalgia and reflex sympathetic dystrophy is associated with the abolition of mechanical allodynia (painful sensation to a tactile stimulus), it seems likely that the sympathetic nervous system controls tactile sensitivity. Presently many experimental data indicate that sympathetic stimulation modulates the function of cutaneous mechanoreceptors.³ If sympathetic stimulation changes sensitivity of the cutaneous mechanoreceptors, it seems reasonable to expect that sympathetic block should modify the tactile sensitivity of the normal skin. The aim of the present study was to determine whether sympathetic block changes tactile sensitivity of the normal skin in man.

Methods. The study protocol was approved by the Institutional Review Board. Subjects of the study were ten patients with various pain syndromes scheduled for stellate ganglion (cervicothoracic sympathetic) block or differential epidural (sympathetic) block. Tactile sensitivity was measured in the normal skin area with the use of von Frey filaments and two-alternative forced-choice procedure with a staircase presentation of touch stimuli. A sequence of touch and no touch stimuli was presented in a series of trials according to the randomly predetermined sequence.⁴ Tactile sensitivity measurements were performed twice in the same area, 10 minutes before the block and 20 minutes after. The measurements were made on both arms (or legs). With the stellate ganglion block (0.25% bupivacaine), the nonblocked side served as a control; with the epidural block (0.5% lidocaine), the diseased side and the healthy side were both affected by the sympathetic block. Temperature of the skin surface was measured before every threshold measurement with a thermister disc probe. Statistical analysis was made using a paired t-test and analysis of variance.

Results. Table 1 shows that with stellate ganglion block, touch threshold was decreased on the side of the block (by $48.8 \pm 3.5\%$, $n=6$, $p=0.002$) without any significant change in the threshold on the healthy nonblocked side ($p=0.003$ for the difference between the sides). With epidural sympathetic block, touch threshold was decreased to the same extent on the diseased and healthy sides, which were both affected by the block ($46.2 \pm 11.4\%$, $p=0.027$ and $47.7 \pm 12.5\%$, $p=0.032$, respectively). All patients with stellate ganglion block developed Horner's syndrome. Skin temperature changes following sympathetic blockade were quite variable, from no increase to an increase of 7°C .

Conclusion. The results show that sympathetic blockade increases tactile sensitivity. They also suggest that sympathetic efferent activity modulates the function of tactile receptors. It was hypothesized that the sympathetic modulation makes tactile receptors less sensitive to touch, less specific, and probably more prone to code tactile stimuli in such a way that the brain recognizes this code as pain.

Table 1. Effect of sympathetic blocks on touch threshold

	Changes (%) in tactile threshold following injection of local anesthetic for sympathetic blocks	
	SGB	EB
Diseased side with block	-48.8 ± 3.5 $p = 0.002$	-46.2 ± 11.4 $p = 0.027$
Healthy side with block	—	-47.7 ± 12.5 $p = 0.032$
Healthy side without block	9.7 ± 8.3 NS	—
Difference	-58.5 ± 10.6 $p = 0.003$	1.5 ± 14.4 NS

SGB - stellate ganglion block, EB - epidural block. Values are mean \pm SEM

References.

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