

PROSTATE CANCER

Erectile function linked to cavernous nerve distribution

Men with erectile dysfunction (ED) prior to radical prostatectomy not only have more cavernous nerve fibers than those who experience normal erections, but they are also arranged differently. These findings, from Shin-Ichi Hisasue and his team at Sapporo Medical University in Japan, have important implications for nerve-sparing prostatectomy.

Investigators examined tissue sections from the apex, midportion and base of 46 prostate hemispheres, originating from 23 men who underwent non-nerve-sparing radical prostatectomy. Cavernous nerves, which supply autonomic innervation to the corpus cavernosum, were visualized using an antibody against neuronal nitric oxide synthase (nNOS).

Preoperative erectile function, body mass index, patient age, and size of specimen were all assessed in relation to total number of nNOS-positive nerves, but objective ED (defined as a change in maximum penile circumference of 20 mm or less) was the only factor

that showed a statistically significant association ($P=0.016$). Interestingly, the subjective measurement of ED, using the International Index of Erectile Function, did not ($P=0.695$).

Specimens from men with objective ED contained significantly more nNOS-positive nerve fibers than those in the non-ED group (median 1,500 versus 649; $P=0.009$), and this difference was most pronounced at the apex. The authors propose that collateral sprouting might occur in this region as a compensatory response to loss of erectile function. In support of this theory, the researchers also observed that nNOS-positive nerve fibers were thinner in patients with ED. Many surgeons believe that careful dissection of the neurovascular bundle (NVB) is most crucial at the apex, and these new data certainly support their view.

Tissue sections were divided into six regions, and the number of fibers counted in each. 65% of all nNOS-positive nerve

fibers were found in the 3 to 5 o'clock portion ($P<0.001$), which roughly corresponds to the position of the NVB. The role of cavernous nerve fibers outside of the NVB is controversial, and although Hisasue *et al.* report that 35% of fibers were not within the NVB, it is still unclear whether these contribute to erectile function. Indeed, the compensatory increase of fibers noted in men with preoperative ED was limited to the 3 to 6 o'clock portion of the prostate.

Differences in cavernous nerve distribution could explain why the rates of erectile recovery after prostatectomy are so variable, and might influence changes to the nerve-sparing procedure that ensure sufficient functional tissue is preserved.

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Original article Hisasue, S. *et al.* Baseline erectile function alters the cavernous nerve quantity and distribution around the prostate. *J. Urol.* **184**, 2062–2067 (2010)