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SENSORY DISTURBANCES OF UPPER EXTREMITY AFTER NERVE-SPARING AXILLARY LYMPH NODE DISSECTION

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Abstract

Preservation of the intercostobrachial nerve during axillary lymph node dissection (nerve-sparing or functional) produces minimal postoperative alterations in sensitivity significantly improving quality of life of operated patients.

Keywords: *intercostobrachial nerve, nerve-sparing dissection, axillary lymph node.*

INTRODUCTION

Management of axilla in patients with operable breast cancer is currently one of the most controversial areas in clinical oncology [*Greco M. et al., 2000*; *Gipponi M. et al., 2006*]. Now, there is little controversy about the use of breast-conserving surgical treatments in place of mastectomy, while the routine use of axillary lymph node dissection (ALND) has persisted [*Henderson I., 2006*].

The main role of ALND in breast cancer patients is to provide staging and prognostic information, but it also improves loco-regional control and overall survival [*Orr R., 1999; Della Rovere G. et al., 2006; Konkin D. et al., 2006*].

ALND is classically associated with a high rate of morbidity: lymphoedema (6-43%), intercostobrachial nerve syndrome – pain (12-51%) + sensory disturbances (58-81%), arm mobility restriction (impaired range of movements – 17-33%), stiffness/weakness of upper extremity (17-33%) [*Ivens D. et al., 1992; Rietmann J. et al., 2003; Schijven M. et al., 2003; Arnaud S. et al., 2004*].

Intercostobrachial nerve syndrome (post-mastectomy pain syndrome, post-axillary dissection pain syndrome) is the most frequent postoperative complication of ALND due to surgical injury (damage) of intercostobrachial (Hyrtl) nerve (ICBN) during ALND [*Foley K., 1987; Vecht C. et al., 1989*].

The ICBN arises as the lateral cutaneous branch of the ventral primary ramus of T_2 (lateral perforating branch of the second intercostal nerve) and supplies sensory fibers to the medial aspect of the upper arm, axillary skin, and upper lateral breast [*Roses D. et al., 1999; Loukas M. et al., 2006*] (Figure 1).

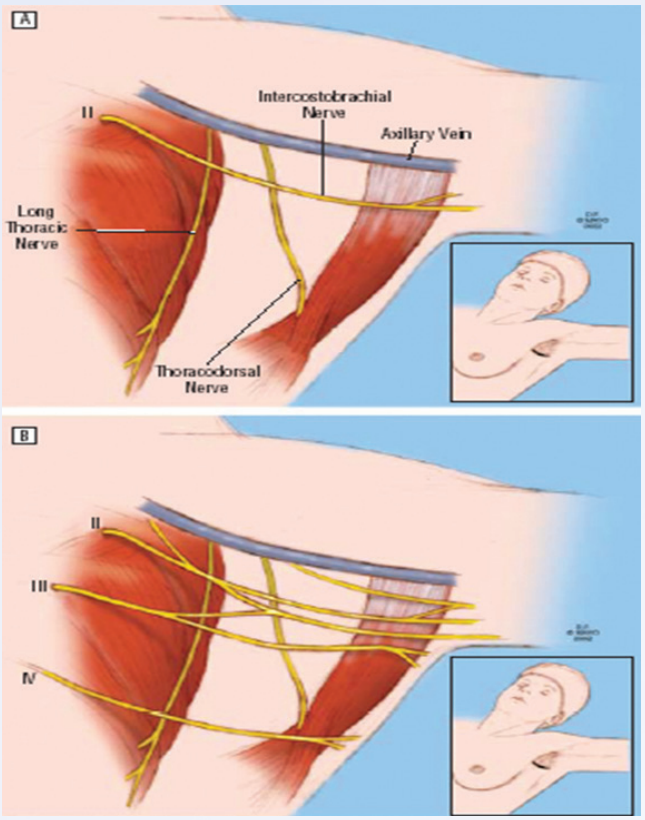

Figure 1. *The motor and sensor nerves of axillary region.*

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Intercostobrachial neuralgia represents neuropathic pain (deafferentation type pain) typically accompanied by remarkable sensory abnormalities in the distribution of the ICBN [*Vecht C. et al., 1989*; *Jung B. et al., 2003*].

AIM AND METHODS

We conducted a prospective study to evaluate the frequency, character and location of sensory disturbances of upper extremity (primary endpoint) in two consecutive groups (2 arms) of women who underwent level-2 ALND for operable breast cancer at the National Center of Oncology in a period of 2005-2009.

In Group I (nerve-preserved or experimental group - 87 patients) besides motor nerves (long thoracic and thoracodorsal nerves) the ICBN was preserved (nerve-sparing or functional ALND). In Group II (control, standard or nerve-sacrificed group - 87 patients) the ICBN was transsected (conventional ALND).

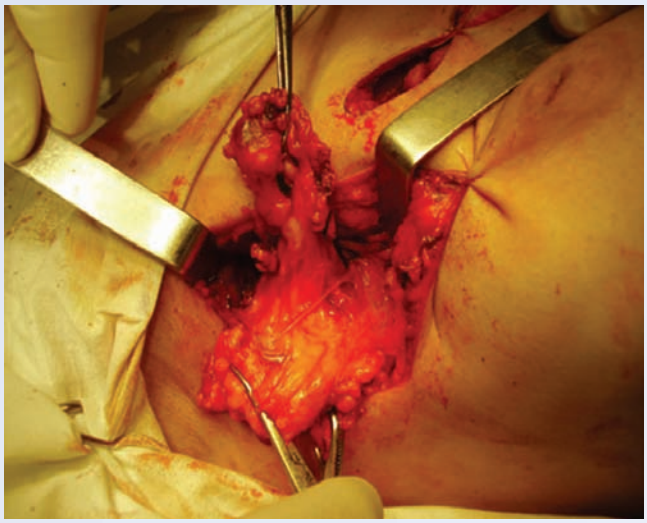

Figure 2. *Intercostobrachial nerve in node-bearing fibroadipose tissue of axillary region (right side).*

The ICBN was preserved in the absence of grossly involved nodes (Figures 2 and 3).

The tactile sensitivity was assessed in 3 months after surgery by special questionnaire (subjective examination) and using standard neurological methods (pricking with a pin, objective examination). The mean age of the patients was 47.8±12. Patients' demographic characterstics were alike. The two groups (preserved and sacrificed) were well balanced for TNM, type of surgery, number of nodes dissected and positive, postoperative adjuvant treatment.

Statistical differences between the Groups were calculated using Pearson chi-square test (c^2). The value of $P < 0.05$ was considered statistically significant.

RESULTS

The analyses of results showed that the prevalence rate of sensory disturbances of upper extremity was 12.6% (11/87) in the Experimental Group, which was significantly different from that of the Control Group (88.5%, 77/87; $p<0.01$) (Figure 4).

In the nerve-preserved group sensory changes had a character of hypesthesia (diminished sensitivity, 3/11) or paresthesia (numbness, 8/11). Meantime, in the control group, sensory changes

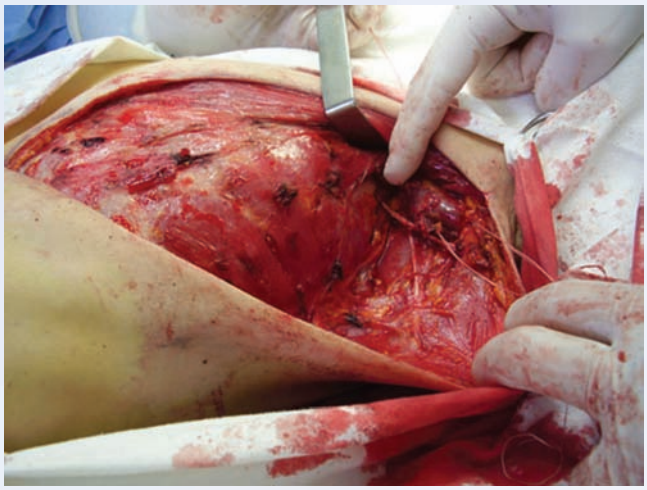

Figure 3. *Triple nerve-preservation after left-sided ALND.*

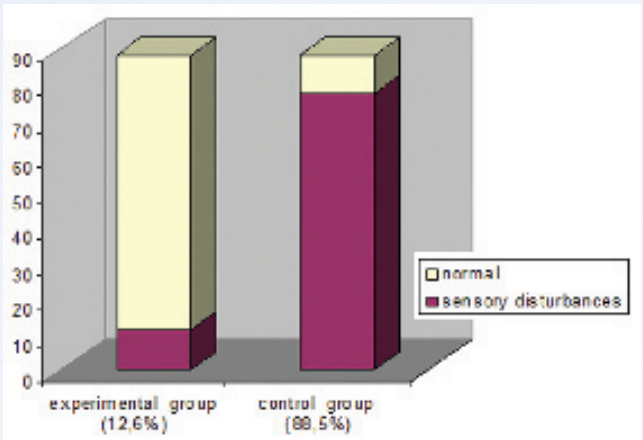

Figure 4. *Sensory disturbances after ALND.*

had more severe character in the form of dysesthesia (painful paresthesia, 30/77) or anesthesia (loss of all types of sensitivity, 45/77), and in 2 patients the phenomenon of allodynia (painful response to innocuous stimulus) was observed.

A larger area of sensory deficit was measured in women with sacrificed nerves (Group II) compared to the preserved (Group I).

CONCLUSION

Our study demonstrates that preservation of the ICBN during ALND (nerve-sparing or functional ALND) produces minimal postoperative alterations in sensitivity significantly improving the quality of life of operated patients.

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