

Sentinel lymph node dissection increases the detection rate of nodal metastases in prostate cancer

Staník M.¹, Čapák I.¹, Macík D.¹, Vašina J.², Lžičářová E.³, Jarkovský J.⁴, Šustr M.¹, Miklánek D.¹, Doležel J.¹

¹ Department of Urology, Masaryk Memorial Cancer Institute, Brno, Czech Republic
² Department of Nuclear Medicine, Masaryk Memorial Cancer Institute, Brno, Czech Republic
³ Department of Pathology, Masaryk Memorial Cancer Institute, Brno, Czech Republic
⁴ Institute of Biostatistics and Analyses, Masaryk University, Brno, Czech Republic



INTRODUCTION & OBJECTIVES

The finding of lymph node metastasis is unfavourable prognostic factor in prostate cancer. Extended pelvic lymphadenectomy (ePLND) is preferred staging tool, however, it may underestimate incidence of nodal involvement. Sentinel lymph node (SLN) biopsy increases the detection of nodal metastases in other solid tumors and becomes alternative to lymphadenectomy in selected patients

The objective of our study is

- to evaluate the benefits of SLN dissection for staging accuracy

MATERIAL & METHODS

- 80 patients in intermediate and high-risk group with estimated risk of lymphadenopathy above 5%, based on Briganti nomogram (1)
- median prostate-specific antigen (PSA) value was 12.7 ng/ml (range 2.8-80.0 ng/ml).

DAY OF SURGERY:

- intraprostatic injection of Tc-99m-labeled nanocolloid (100 MBq)
- the planar lymphoscintigraphy (Fig. 1a) and single-photon emission computer tomography (SPECT) fused with CT images (Fig. 1b) were performed after 2 hours to localize SLNs

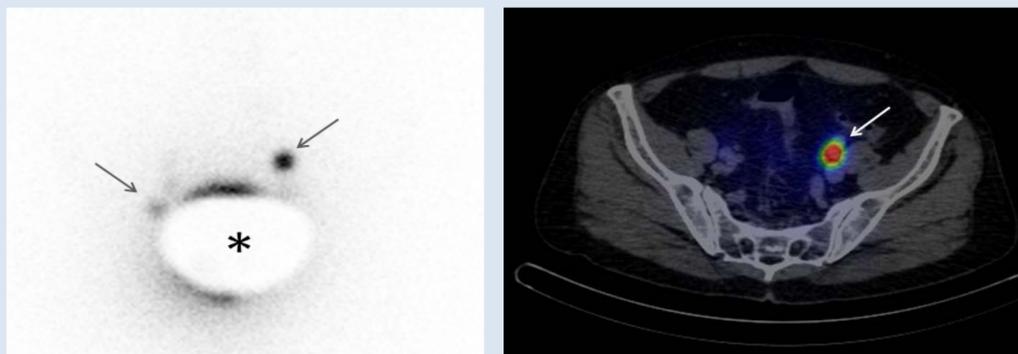


Fig. 1 SLN (arrows) localized with planar scintigraphy (a), the prostate with applied radiocolloid is shielded (asterisk). Fusion of SPECT and CT images (b) facilitates anatomic localization of SLNs

- SLN dissection after 3 to 6 hours
- backup ePLND comprising external iliac, obturator, internal iliac regions
- common iliac and presacral LNs were removed only if SLN occurred in that region
- standard histologic examination: nodes sectioned to 2 mm slices
- all SLNs were serially sectioned every 150 μm and examined using H&E staining; immunohistochemical staining was applied every 300 μm (Fig. 2)

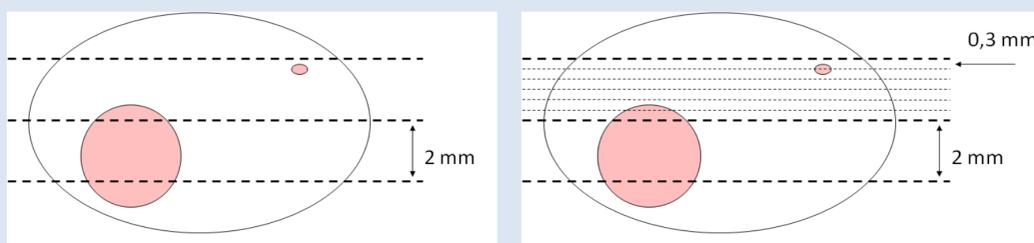


Fig. 2 Different protocols of the standard (a) and special (b) histologic examination of lymph nodes. Impact of serial sectioning and immunohistochemistry on the detection of LN micrometastasis (red circle)

RESULTS

- a total of 309/335 SLNs were removed (median 4, IQR 3-5, range 0-8)
- 56 SLNs (18%) in 22 patients (28%) were located outside the ePLND template (Fig. 3a)
- subsequent ePLND yielded median of 17 LNs (range, 8-43)
- LN metastases were found in 32/80 (40%) patients (Fig. 3b)

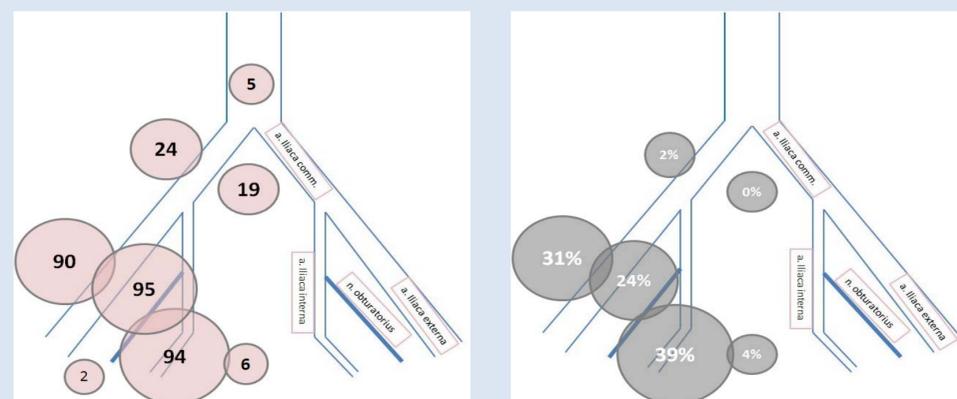


Fig. 3 Absolute numbers of detected SLNs (a) and relative distribution of LN metastases (b) per region

- without radioguided SLN dissection we would not have removed LN mts in 5/32 (16%) of the patients (1x common iliac, 2x pararectal, 2x posteriorly to the vesical and umbilical branches of internal iliac vessels)
- using the standard histology protocol we would have diagnosed mts in 23/32 (72%) patients with median size of 2.8 mm (range 1.1-10.0)
- serial sectioning of SLN and immunohistochemistry led to the detection of mts in additional 9/32 (28%) patients with median size of 0.2 mm (range 0.1-1.1)

Extent of lymphadenectomy	Location of SLNs (%)	Correct staging in pN1 patients	All LN+ removed in pN1 patients
Obt. (limited PLND)	95/335 (28%)	11/32 (34%)	5/32 (16%)
Obt. + Ext.	185/335 (55%)	20/32 (63%)	11/32 (34%)
Obt. + Ext. + Int. (extended PLND)	279/335 (83%)	28/32 (88%)	27/32 (84%)
extended PLND + SNB	335/335 (100%)	32/32 (100%)	32/32 (100%)

CONCLUSIONS

- SLN biopsy provides individualized template of PLND and meticulous examination of primary nodes
- ePLND comprised 83% of SLNs, at least one SLN laid outside its template in 28% of the patients
- without radioguided SLN dissection and special histologic examination of SLNs we would not have diagnosed metastases in 13 of 32 patients (41%)
- SLN dissection increased the detection rate of nodal metastases by 68% in comparison to ePLND alone
- patients may benefit from more accurate staging and tailored adjuvant therapy.