Among node-positive patients, the recurrence rate following D2 was significantly lower than that after D1. Among node-negative patients, there was no difference in recurrence rate between the two groups. Miwa therefore suggests that we should always dissect the lymphatic basins even in cases with no sentinel node metastasis. In addition, patients with sentinel nodes containing metastasis should be treated with the D2 procedure.

Aikou et al. also stated that wide and complicated lymphatic stream from a gastric tumor contributed to the relatively high (23%) incidence of micrometastases and the frequent occurrence of skip metastasis.

A similar view was reported by Kosaka et al. Namely. According to their survey, not every sentinel node is located in the perigastric region near the primary tumor and that, if the preoperative examination indicates submucosal invasion, then a systematic regional lymph node dissection should therefore be carried out. Kosaka reports skip metastases in 15% of 51% patients with gastric cancer.

Finally, according to Maruyama opinion, the ability to identify a tumor free SN might enable the surgeon to avoid the morbidity associated with radical lymphadenectomy in patients with gastric cancer. But he concludes that it is too early to apply sentinel node biopsy for reducing the extent of lymphadenectomy for gastric cancer because of the complicated anatomy of lymphatic streams from the stomach, and because of the frequent skip metastasis and micrometastasis.

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The sentinel lymph node concept in thyroid carcinoma - Preliminary results

KEYWORDS: Thyroid Neoplasms; Sentinel Lymph Node Biopsy

Sentinel lymph node was defined as the first lymph node that the tumor would drain to, within the regional lymphatic basin of that tumor. The concept of sentinel lymph node (SLN) being predictive of the status of the regional lymphatic basin is commonly attributed to Ramon Canabas, a South American surgeon, following his pioneering work on the lymphatic drainage in carcinoma of the penis in 100 patients back in 1977 (1). Gould and his colleagues from the Washington Hospital Center published their work and first introduced (sentinel node) in tumors of a parotid gland in 1951 (2). In 1992, Morton and his colleagues introduced the concept of SLN in to the management of melanoma especially those affecting the trunk where the lymphatic drainage could be ambiguous, using a blue dye (isosulfan blue) injected around melanoma or the biopsy scar (3). In the early nineties, SLN concept was applied to breast cancer using a blue dye and later using a radioactive colloid to localize the sentinel node (4,5). Recent published literature seems to support the fact that a combination of blue dye and radioisotope gives better results than either substance on its own. (5). In 1998, Kelomen and co-workers have published the first results on SLN lymphadenectomy in thyroid carcinomas in 17 patients (7).

Different methods have been used for lymphatic mapping. First it was the application of vital color and later the concept lymphoscintigraphy and gamma probe was established. The vital dye and radioisotopic are applied intratumorally. Lymphoscintigraphy is performing preoperatively, while additional gamma probe and injection of vital dye are performed intraoperatively. After thyroidectomy marked sentinel lymph nodes are dissected and sent to frozen section and subsequent definitive histopathology.

The ideal radionucrator should have particles small enough to enter the lymphatics. All radioisotracers that have been used are tagged to Technetium 99 with half-life time of 6 h, which enables the radioactive source to decay rapidly after injection (8). The optimal dose of radioactivity is still not established and ranges from 22 to 37 MBq per injection (9,10). Different vital dye was used in different studies - Methylene Blau, Patent Blue V, Isosulfan blue dye, in doses of 0.1 to 0.8 ml (mean 0.5 ml) per injection (7,11,12). From 2001 to 2002, we performed SLN biopsy in 14 patients with thyroid

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tumors. There were 5 cases of papillary thyroid carcinoma (one in thyroglos-
sal duct cyst), 1 Hurthle cell carcinoma, 7 follicular adenomas and 1
Hashimoto thyroids. All except one (Patent Blue V) were stained with Meitlen
Blau dye (mean 0.5ml/per injection). SLN identification rate was 72% (the
staining failed in one case of follicular adenoma, 1/14). In all cases of malign-
nancy and follicular lesions on frozen section histopathology, after frozen sec-
tion of SLN, the dissection of central and/or lateral (jugular) lymph nodes
were performed. All SLN were examined both by frozen section and HE defini-
tive histopathology. SLN were located in cervico-central basins in 12 of 14 cases.
In 1 case of follicular adenoma SLNs were first detected in jugular basin ("skip")
and in a case of papillary carcinoma in the thyroglossal duct cyst; SLNs were
located in the level of carotid artery bifurcation bilaterally. We found no false-
positive or negative results on HE definitive examination.

The impact of lymph node metastases in differentiated thyroid carcinoma
is still controversial. Most of the relevant studies have shown no impact on
long-term outcome (13,13). Presence of cervical lymph node metastases
increases the regional relapse risk (14, 15).

The management of cervical lymph nodes varies from "berry picking" to
modified radical neck dissection. There is no argument of the necessity of
neck dissection in cases of clinically enlarged lymph nodes. There is a signif-
ificant disproportion in percentage of pre- and intraoperatively enlarged lymph
nodes (27-45%) and histologically confirmed micro-metastases (80%-90%)
in papillary thyroid carcinoma. Explanation for this could be in elective lymph
node examination performed by experienced surgeons (16-21). The fre-
cuency of true lymphatic metastases from follicular thyroid carcinoma to regional
lymph nodes is extremely unusual, being less than 1% (22).

Between 15% and 75% of all medullary thyroid carcinoma (MTC) cases
have spread to the lymph nodes at the time of diagnosis. For this reason, Clark
advocates a formal modified radical neck dissection for an lesion
greater than 2 cm on the side in which it is located with a central node dis-
section on the contralateral side (23).

Kellerman and coworkers published that in 2 of 17 cases colored SLN were
retrosternal and so invisible intraoperatively using only blue dye (7). The
group of Japanese authors claim that concordance between the SLN findings and
regional lymph node status on definitive histopathology was 90.5%. Two
of 22 patients had negative SLN and positive non-SLN nodes. The overall reli-
ability of the method was 86.3% (11). Arch-Ferrer analyzed the accuracy of
HE and immunohistochemistry staining and found 60% and 100% accuracy,
respectively (24). Pelizzo reported 75.9% located SLN using only Patent Blue
V dye. He found no false negative results after examination of both SLN and
NSLN node (12). The group from Salzburg failed to detect SLN in cases with
follicular carcinoma of the thyroid using both preoperative lymphoscintigraphy
and intraoperative hand-held gamma probe (10). The group form University of
Rome "La Sapienza" used the combination of all three methods of lymphatic
mapping in papillary thyroid carcinoma, and showed 100% accuracy all
together. Considering the mentioned methods, one method alone, identification rates were 60%, 50%
and 83% for preoperative lymphoscintigraphy, vital dye and gamma probe
scanning respectively (9).

In the current literature the average rate of SLN identification is 91% (66-
100%) and when identified, the SLN accurately predicts the disease status of
the neck in most patients (80%-100%). Limitations of SLN biopsy on thyroid
cancer include staining of parathyroid glands, draining to medistinum "shine
through" effect (25). The SLN biopsy for thyroid carcinoma is good and fea-
sible technique for estimating the cervical lymph node status. It is now ne-
necessary to check the diagnostic accuracy of this procedure through controlled
trials involving a more extended lymph node dissection in the neck. The clin-
cal significance of this technique in thyroid cancer remains to be determined.

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