



# SENTINEL LYMPH NODE BIOPSY IN THYROID CARCINOMAS

- A SINGLE INSTITUTION EXPERIENCE -

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# INTRODUCTION

The authors declare that there are no conflicts of interest.

## Lymphonodal metastases

- PROBLEM: **occult LN metastases** (pN1 in cN0)
- preoperative evaluation of neck LNs by palpation and ultrasound is **not accurate**
- **NO CONSENSUS** in surgical management of LNs:
  - ✓ “wait and see”
  - ✓ “berry picking”
  - ✓ prophylactic dissections
  - ✓ sentinel lymph node biopsy (SLNB)

## SLNB concept

- precise LN staging (cN0 → pN1)
- timely, instead of delayed dissection
- selective, instead of prophylactic dissection
- reduced risk of loco-regional relapse
- reduction of postoperative complications

# SLNB concept in thyroid carcinoma

## Kelemen and coworkers, 1998

- **Tracers:** vital dyes, Tc99m, fluorescent, carbon black, combination..
- **3 meta-analyses:** Raijmakers (2008), Balasubramanian (2011), Kaczka (2012)
- **SLN identification rate:** 91% (66-100%)
- **Predictive value of SLN:** 80-100%

## Original SLNB technique

### Dzodic Radan, World J Surg, 2006\*

- tracer: **methylene blue dye**
- region: both **jugulo-carotid**
- PH analysis: **intraoperative, frozen section**
- goal: **immediate decision** on lateral neck dissection

\* *Dzodic R. et al.* Sentinel lymph node biopsy may be used to support the decision to perform modified radical neck dissection in differentiated thyroid carcinoma. *World J Surg* 2006; 30(5): 841-846.



**The aim was to show the accuracy of SLNB using methylene blue dye in detection of LN metastases in lateral neck compartments, selecting cN0 patients with papillary and medullary thyroid carcinomas and microcarcinomas for immediate lateral neck dissection.**



# MATERIALS AND METHODS



## 3 SLNB studies:

- **STUDY I: 153 cN0 patients with PTC**
- **STUDY II: 111 cN0 patients with PTMC**  
( $\leq 10$ mm tumor size)
- **STUDY III: 15 cN0 patients with micro-MTC**  
( $\leq 10$ mm tumor size) **and serum calcitonin levels**  
**<1000 pg/ml**

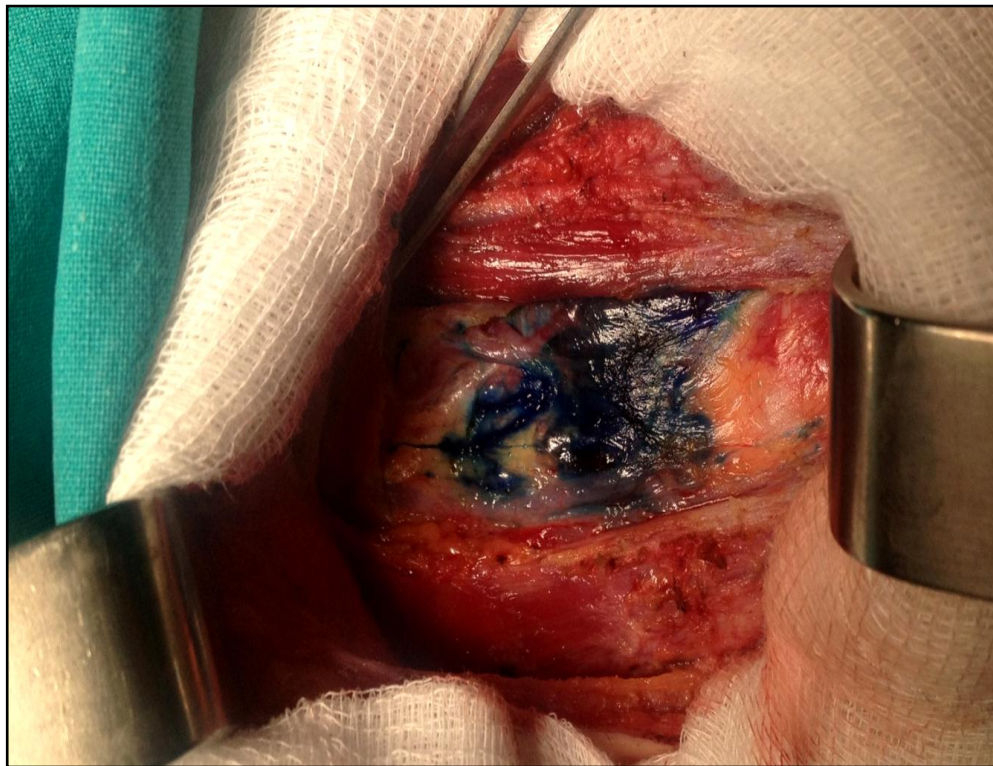
**THE SAME SURGICAL STRATEGY!**

# Surgical treatment of thyroid carcinoma



✓ **Methylene  
blue dye  
injection**

# Surgical treatment of thyroid carcinoma



**Central neck  
compartment:  
lymphatic  
vessels and  
lymph nodes are  
colored in blue**

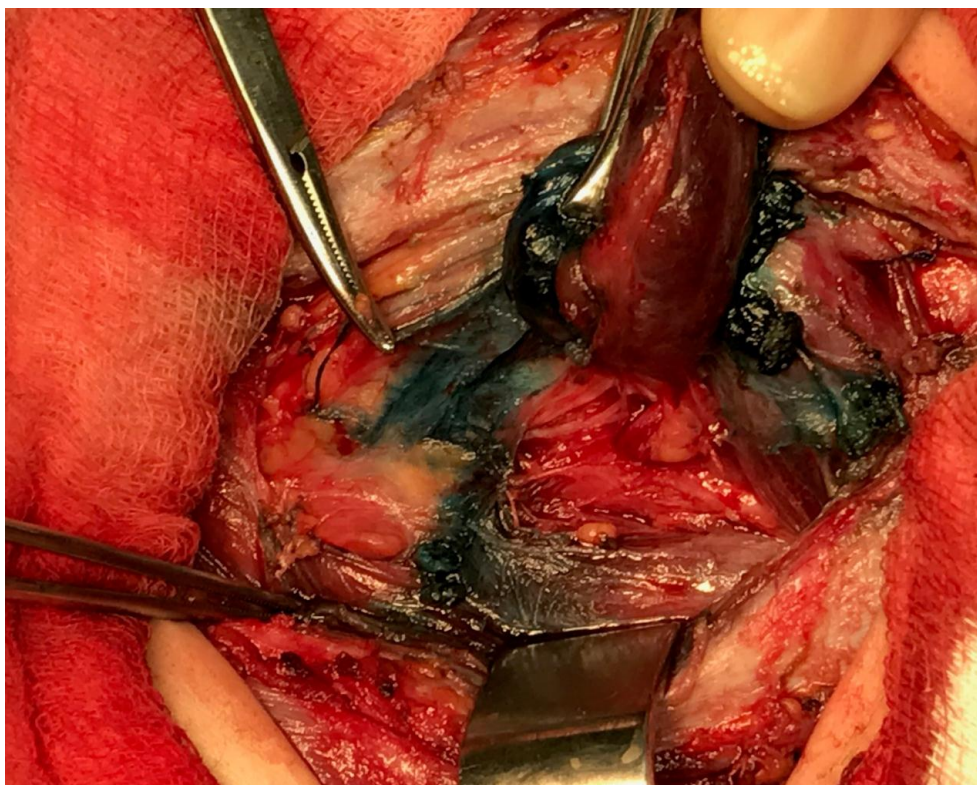
## Surgical treatment of thyroid carcinoma



- ✓ **Lobectomy**  
(removal of the tumor)
- ✓ **Frozen section analysis**
- ✓ **Completion thyroidectomy**



# Surgical treatment of thyroid carcinoma



✓ Prophylactic  
central neck  
dissection

lymph nodes are  
blue

parathyroid glands  
are not colored!!

**EASIER  
DISSECTION!**

# Surgical treatment of thyroid carcinoma



✓ **SLNB of both  
jugulo-carotid  
regions**

## Surgical treatment of thyroid carcinoma



✓ Frozen section analysis of SLN

**POSITIVE SLN**



✓ Immediate lateral neck dissection



# RESULTS

**There were no allergic reactions on methylene blue dye!!!**



Diagnostic test	Study I (PTC) %	Study II (PTMC) %	Study III (micro-MTC) %
Identification rate	139/153 (90.8)	93/111 (83.8)	15/15 (100)
Lateral LNMs	24	7.21	6.7
Sensitivity	85.7	57.14	100
Specificity	96.7	100	100
PPV	88.2	100	100
NPV	95.9	97.14	100
<b>Accuracy</b>	<b>94.3</b>	<b>97.25</b>	<b>100</b>

# Literature data on SLNB of JCC

Study	Marker	N	IR (%)	Accuracy (%)	Lateral LNM (%)	
<b>Ikeda (2011)</b>	<b>ICG</b>	<b>12</b>	<b>100</b>	<b>100</b>	<b>50</b>	
<b>Lee (2011)</b>	<b>Tc99m</b>	<b>94</b>	<b>63.8</b>	<b>-</b>	<b>31.7</b>	
Our studies	<b>Study I</b>	<b>MBD</b>	<b>153</b>	<b>90.8</b>	<b>94.9</b>	<b>24</b>
	<b>Study II</b>	<b>MBD</b>	<b>111</b>	<b>83.8</b>	<b>97.25</b>	<b>7.21</b>
	<b>Study III</b>	<b>MBD</b>	<b>15</b>	<b>100</b>	<b>100</b>	<b>6.7</b>

DIAGNOSTIC TEST	Meta-analyses (%)	Our results		
		Study I	Study II	Study III
IR (%)	84.4 / 98.8 / 97.8	90.8	83.8	100
SN	91.6 / 67 / 100 (86.2)	86.7	57.1	100
SP	100	97.2	100	100
<b>ACCURACY</b>	<b>95.8 / 88 / 100 (94.6)</b>	<b>94.9</b>	<b>97.2</b>	<b>100</b>

**3 meta-analyses:** Raijmakers (2008), Balasubramanian (2011), Kaczka (2012)  
**Tracers:** dye-Tc99m-combination



# CONCLUSIONS

**Original SLNB technique using MBD is safe, cheap, feasible and accurate in detection of LN metastases in lateral neck compartments in cN0 patients with thyroid carcinomas**



# CONCLUSIONS

**SLNB using MBD enables adequate intraoperative LN staging and one-time lateral neck dissection in selected patients**



# CONCLUSIONS

**SLNB using MBD helps avoid unnecessary prophylactic lateral dissections in all patients**



# CONCLUSIONS

**SLNB using MBD reduces the rate of undetected “skip” metastases**



# CONCLUSIONS

**SLNB using MBD optimizes RAI therapy in cN0, but pN1b patients**



## THANK YOU



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