THE VALUE OF PALPATION AND ULTRASOUND IN DIAGNOSTICS OF NECK LYMPH NODES AT HISTOLOGICALLY VERIFIED PRIMARY LARYNX AND PHARYNX MALIGNANCIES

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VREDNOST PALPACIJE I ULTRAZVUKA U DIJAGNOZI LIMFONODUSA VRATA KOD PATOHISTOLOŠKIH VERIFIKOVANIH PRIMARNIH MALIGNOMA LARINKSA I FARINKSA

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INTRODUCTION

According to Fish, there are three main head and neck lymph systems: 1. Waldeyer’s ring consisting of tonsils (palatol, lingual, tubular and pharyngeal) and submucous lymph follicles of upper airways and pharynx, 2. Pericervical lymph nodes including: submental, submandibular, parotid, retroauricular, occipital, sublingual and retropharyngeal, 3. Cervical lymph nodes divided into superficial and deep. The superficial ones include lateral and medial lymph nodes, along external jugular vein. Deep lymph nodes are subclassified on frontal or medial (subhyoidal or supraepiglottal, supralaryngeal or Trotter’s or Delphian, suprathyroid, suprarachal and paratracheal). Lateral group is made of: Lymph node chain of internal jugular vein, Lymph node chain of accessory nerve and supraclavicular lymph nodes. Posterior group includes lymph nodes under m. trapezius. Basic diagnostic methods of neck lymphadenopathy are patient history and neck palpation; additional methods are: ultrasound examination, lymphography, computerized tomography, nuclear magnetic resonance, lymphoscintigraphy, positron emission tomography and neck biopsy with

SAŽETAK

Palpacija predstavlja subjektivnu, a ultrasonografija objektivnu metodu detekcije limfonomusa vrata. Cilj rada je odrediti vrednost palpacije i ultrazvuka u detekciji cervikalne limfadenopatije kod pathologskih verifikovanih primarnih tumorja larinske i farinske.

ABSTRACT

Palpation is subjective, while ultrasonography is an objective method of neck lymph nodes detection. The aim of the study is to determine the value of palpation and ultrasound in detection of cervical lymphadenopathy at histologically verified primary larynx and pharynx tumors. Research was carried out on 25 patients treated at otorhinolaryngology department of Clinical Hospital Center in Kragujevac from 01.01.2003. to 01.03.2004. After complete clinical otorhinolaryngological examination, the patients were exposed to ultrasound in the Radiology Center in Kragujevac. Maximal diameter, minimal diameter, axis, consistency, tenderness and fixation of lymph nodes were determined by ultrasonography. Before these examinations, histological verification of primary tumor was carried out. Thirty six secondary neck deposits were detected by ultrasound. The results of our research show that ultrasound method is more effective in determination of vertical and minimal diameter than palpation. The qualities of palpation for early local-regional primary malignancies expansion are: soft consistency, lack of tenderness and mobility, while the attributes of progressive expansion in neck are: hard consistency, tenderness and fixation. Echosonographic hypoecho-genicity and heterogeneity of lymph nodes are equivalents for malign lymphadenopathy. For lymph nodes detection in all neck regions, ultrasound method has enormous advantage over palpation. Our study shows that with secondary neck deposits, beside palpation, ultrasound method with the accent on qualitative lymph nodes characteristics should be applied. Examination of new echosonographic qualitative parameters of secondary deposits is needed.

Key words: palpation, ultrasound, maximal and minimal diameter, lymph node, metastasis, neck
histological examination. Neck palpation presents a subjective method, but it is important part of otolaryngological examination. Its criteria for existence of malignant lymphadenopathy are based on their solidity, tenderness, mobility according to liable structures and skin. Malignant lymphadenopathy is characterized by soft and/or hard consistency, non-tenderness, mobility, and/or fixation to surrounding structures. Ultrasound can detect lymph node diameter 4 to 5 mm (1-5). Ultrasound criteria for malignant lymphadenopathy are: Ehogenicity, size (maximal diameter is longest axis of lymph node while minimal diameter is the biggest one placed perpendicular on maximal diameter), vascularisation and homogeneity. Malignant lymphadenopathy is characterized by hypo- or isoechogenicity, diameter more than 10 mm(6) with relation between maximal and minimal diameter near 1 (7-11), increased vascularisation, heterogeneity. Findings of cervical lymphadenopathy with choanographic characteristics of secondary deposits in big percent confirm diagnosis, but findings of cervical lymphadenopathy with ultrasound features, which are characteristic of benign lymphadenopathy, do not eliminate malignant process. This apparent contradiction can be explained by early phase in evolution of malignant cells in cervical lymph node, which is clinically not palpable, and according to TNM classification, corresponds to N0+. Some authors, during detection and differentiation of lymphadenopathy, give priority to ultrasound over other methods (13). Palpation and ultrasound have their advantages and disadvantages, but they are complementary in diagnosis and differential diagnosis of neck tumours.

The aim of this work is to evaluate the value of palpation and ultrasound in detection of cervical lymphadenopathy in histologically verified primary larynx and pharynx malignant tumors, and to investigate:

1. Which of the above mentioned methods is better in discovering existing neck lymph nodes;
2. Whether the palpation or ultrasound is more precise in determining maximal diameter of lymph nodes;
3. Could ultrasound be statistically more important method in detection of lymph node minimal diameter versus palpation;
4. Which are the qualities of palpation that dominate in secondary neck deposits because of primary malignant laryngopharyngeal tumors;
5. Whether the qualities of ehogenicity and homogeneity could be connected to secondary neck deposits;
6. Is there statistically important difference in the number of detected lymph nodes depending on region of detection between palpation and ultrasound.

PATIENTS AND METHODS

Twenty-five patients treated at ENT department CHC Kragujevac from 01. 01. 2003 to 31. 03. 2004. were examined in this retrospective study. All patients, with diagnosed or suspected neck tumours by standard examination methods (history, palpation), were sent to Radiological center CHC Kragujevac for ultrasound neck examination. Maximal diameter, minimal diameter, consistency, local sensitivity, mobility and localization were detected by palpation. On the other side, maximal diameter, minimal diameter, ehogenicity, homogeneity and localization were detected by ultrasonography. The results were compared by descriptive statistic method and non-parametar statistic test, in other words by Hi-square test; the results are shown in tables and graphics.

RESULTS

In 25 patients with primary histologically verified laryngopharyngeal malignancy, 36 lymph nodes were detected by palpation, while 90 of them were detected by ultrasound method (Figure 1). The maximal diameter of lymph nodes was measured. With total number of 36 palpated lymph nodes, 13 of them were 1–10mm size, 14 of them were 11–20mm size and 9 of them in size over 20mm. Ehosonography discovered 56 lymph nodes with maximal diameter 1–10mm, 22 lymph nodes with maximal diameter 11–20mm and 12 lymph nodes with maximal diameter over 20mm (Table 1). Hi square test=11, 73; df=5; p<0, 05. Ultrasound better discovers lymph nodes with maximal diameter 1–10mm, in contrast to palpation. Lymph node minimal diameter was also estimated. Seventeen secondary deposits with minimal diameter 1–10 mm were palpated, as well as 12 lymph nodes with 11–20 mm size and 11 lymph nodes over 20mm diameter, total number of 36. In contrast to palpation ehosonographic neck examination discovered the total number of 90 lymph nodes, 56 of them with 1–10mm minimal diameter, 19 of them with 11–20mm minimal diameter and 15 of them with diameter over 20mm (Figure 2). Hi square test=9, 25; df=2; p<0, 05. Ultrasoundographic neck examination is statistically much better procedure in determining minimal diameter of secondary neck deposits in relation to palpation (1–10 mm interval). The qualities of palpation important for malignant lymphadenopathy at histologically verified laryngopharyngeal malignancies are: consistency, local tenderness and mobility. Out of 36 (100%) palpated lymph nodes, 22 of them were of soft consistency (60%), while 14 of them were of hard consistency (38%); Four lymph nodes (11%) were with local tenderness, and 32 of them (89%) were with not tender. The number of detected mobile lymph nodes was 22 (62%), and the number of fixed lymph nodes was 14 (38%) (Table 2). The eventual existence of statistically important difference in secondary deposits detection between palpation and neck ultrasonography according to all anatomic regions was investigated. Seventeen lymph nodes (47,5%) were detected by palpation and ultrasound in jugulodigastric region. In the upper jugular region, the existence of 7 lymph nodes (19,4%) was detected by palpation, and 25 of them (27,7%) were detected by ultrasonography. Three lymph nodes (8,3%) were detected by palpation, and 18 lymph nodes (20%) were detected by ultrasonography in the middle jugular region. Three lymph nodes (8,3%) were detected by palpation and 5 lymph nodes(5,5%) were detected by ultrasonography in lower jugular region (Table 3).
is, according to statistics, much better method in lymph nodes detection than palpation, regarding all neck regions, with the exception of jugulodigastric region where was not present statistical difference. The results of neck ultrasonography for the echogenicity and homogeneity quality were examined. Out of 90 detected lymph nodes (100), 5 of them (5,6%) were hyperechogenic, while the other five (5,6%) where isoechogenic, and 80 (88,8%) were hypoechogenic. The number of homogen lymph nodes was 5 (5,6%); while the number of heterogen lymph nodes was 85 (94,4%); (Table 3; Figure 3).

**Table 1.** Distinguishing of maximal diameter lymph nodes by palpation and ultrasound.

<table>
<thead>
<tr>
<th></th>
<th>Maximal diameter 1–10mm</th>
<th>Maximal diameter 11–20mm</th>
<th>Maximal diameter over 20mm</th>
<th>Σ</th>
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<tbody>
<tr>
<td>Palpation</td>
<td>13</td>
<td>14</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>56</td>
<td>22</td>
<td>12</td>
<td>90</td>
</tr>
<tr>
<td>Σ</td>
<td>69</td>
<td>36</td>
<td>21</td>
<td>126</td>
</tr>
</tbody>
</table>

**Figure 1.** Palpation and ultrasound in detection of lymph nodes.

**Table 2.** The neck lymph nodes characteristics of palpation.

<table>
<thead>
<tr>
<th></th>
<th>Consistency</th>
<th>Local sensitivity</th>
<th>Mobility</th>
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<tbody>
<tr>
<td></td>
<td>Soft</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hard</td>
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<td>No</td>
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</table>

**Figure 2.** Detecting minimal diameter by palpation and ultrasound (MinD-minimal diameter in mm).

**DISCUSSION**

The bigger number of secondary neck deposits detected by ultrasound in contrast to palpation can be explained with great specificity of ultrasound (94%) (13), according to some authors. Determination of maximal and minimal diameter is important in everyday practical diagnosis of neck tumefact (14). The other authors point to the importance of relation between these two diameters (MaxD/MinD) and if it is closer to 1 (in other words if there is enlargement of minimal diameter), the shape becomes more spheric, which point to metastatic lymph nodes (12). The failure of palpation in evaluation of maximal and minimal diameter can be explained by inexperi-ence of doctors, as well as the presence of surrounding soft tissue. Although neck palpation is a subjective method, malignant lymphadenopathy in its early phase can be suspected if, besides elliptic shape, there is soft consistency, lack of tenderness and mobility. This point of view in otorhinolaryngology, regarding histologically confirmed primary laryngopharyngeal malignant tumors, provides the application of appropriate oncological protocols; in other words, lymph nodes in patients with mentioned malignancies are considered regional spread of malign disease. The palpation of lymph nodes with soft consistency, non-tenderness and mobility point to early phase of malign disease regional spread, in contrast to lymph nodes with hard consistency, tenderness and fixation which points to advanced phase of regional spread when malignant cells penetrate the surrounding soft tissue. The ultrasound diagnostics pays more attention to qualitative features of tumours. Hypoehogenic lymph nodes in 88,8% point to presence of secondary neck deposits, and similar results (69% of Hypoehogenicity) were reported by Youseke T., and his assistants (12). The same group of authors, apart from hypoehogenicity in diagnosis of malignant lymph nodes attach importance to dotted dark ehogenic spots, absence of hilar outlines and cystical structure of lymph nodes, and these attributes are

**Table 3.** Detected lymph nodes according to anatomic neck region by palpation and ultrasound (JDR-jugulodigastric region, UJR-upper jugular region, MJR-middle jugular region, LJL-lower jugular region, SMR-submandibular region, SCR-supravascuclar region).

<table>
<thead>
<tr>
<th></th>
<th>JDR</th>
<th>UJR</th>
<th>MJR</th>
<th>LJR</th>
<th>SMR</th>
<th>SKR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palpation</td>
<td>17</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>17</td>
<td>25</td>
<td>18</td>
<td>5</td>
<td>17</td>
<td>8</td>
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<tr>
<td>Σ</td>
<td>34</td>
<td>32</td>
<td>21</td>
<td>8</td>
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**Figure 2.** The quality of homogeneity at secondary neck deposits.
in correlation with the attributes of heterogeneity which are, in our study, found in 85%. This trend goes in favour of clinically non-palpable neck metastases; in other words, it goes in favour of occult metastatic lymph nodes detection. Detection of occult neck metastases depends on experience of doctors who undertake the examination of neck tumours by palpation and chesonography. Ultrasonography detects more precisely the lymph nodes in all neck regions except in jugulodigastric region, in contrast to palpation. Palpation has more difficulty in detection of more linked secondary neck deposits, in other words, “packages” of lymph nodes.

REFERENCES