PAPILLARY THYROID CARCINOMA (PTC) is the most common histological type of thyroid malignancy, with an increasing incidence in many countries [1]. According to unpublished data collected at the Institute for Oncology and Radiology of Serbia, its prevalence in our country has been increasing in the past two decades.

The pyramidal lobe (PL) of the thyroid represents the remnant of the distal part of thyroglossal duct that varies in size, shape and position [2-6]. Its reported frequency in surgical specimen ranges from 12% [5] to 61% [6]. Surgical importance of PL is multiple. Removal of PL is a standard procedure of total thyroidectomy because, if not removed, it can later become site of recurrence of malignancy [7, 8]. In addition, preserved PL in PTC patients decreases the anticipated benefit of adjuvant radioiodine therapy by absorbing the radioactive material [5, 9] as well as the sensitivity of serum thyroglobulin in the follow-up [10].

PTC in PL is almost always a part of multifocal disease of the thyroid gland [5, 11], rather than isolated single focus PTC [4, 12-14]. Surgical treatment for this disease remains controversial, especially the extent of neck dissection.

The aim of this study was to determine the incidence of primary single focus PTC in PL of the thyroid and...
lymphonodal metastases from PL, as well as to present a single surgeon experience in the management of PL PTC.

**Materials and Methods**

We performed a retrospective analysis of records of all patients treated surgically for PTC at the Institute for Oncology and Radiology of Serbia from year 2003 to 2013. These records included: data on preoperative diagnostics, operative reports, pathological reports from intraoperative frozen section analysis and formalin-fixed, paraffin-processed tissue samples standard pathology, as well as data on the postoperative follow-up period. Only patients with PTC single focus in the PL were included in this study. Cases with PTC focus in PL as a part of multifocal disease were excluded. An appropriate institutional review board approved our study and informed consent was obtained from the patients.

**Results**

Altogether 753 patients were treated for PTC in our institution during a 10 - year period (2003-2013). Indications for surgery were clinically and ultrasonically suspect thyroid lesion, or positive cytology findings of fine needle aspiration biopsy (FNAB). Majority of patients (66.52%) had PTC single focus in one of the lobes. In 33.08% of patients PTC was multifocal, with foci affecting PL in 2% of patients. Only 3 patients (0.4%) had primary PTC in PL as the only PTC focus. They were all females aged 36, 41 and 22 at the time of surgery (Table 1).

All patients were operated by a single surgeon (R.D.). Procedure included exploration of thyroid gland, peritumoral injection of methylene blue dye and frozen section of excised PL and isthmus. After confirmation of malignancy, a total thyroidectomy (TT) with central neck dissection (CND) was done. In addition, sentinel lymph node (LN) biopsy was performed in level III/IV of both jugulo-carotid regions and sentinels were examined by frozen section.

Primary tumors were 12, 20 and 15mm in diameter, respectively, with no infiltration of the thyroid gland capsule (Table 1). Associated thyroid disease was present in all three cases: colloid nodular goiter in one patient and Hashimoto’s thyroiditis in other two. In total 9, 31 and 22 LNs from both central and lateral compartments were examined, per patient (Table 1). The only metastatic LN was prelaryngeal (Delphian) LN in a patient with primary tumor 15mm in size.

Postoperatively (Table 1), all three patients were on suppressive therapy with L-thyroxin, while patient with Delphian LN metastasis was treated with radioiodine (52.9mCi). Patients were followed 10, 15 and 118 months. Clinically, there were no signs of relapse or pathological lymphadenopathy in central or lateral neck regions. Serum thyroglobulin levels were less than 0.1ng/mL and TSH was suppressed in all patients. No patients had clinical or laboratory signs of hypoparathyroidism. None had recurrent laryngeal nerve (RLN) injury. To the present day, patients showed no signs of disease recurrence.

**Discussion**

PTC is the most common thyroid malignancy. In our experience, in past four years in Serbia its prevalence was increased by 300% (Institute for Oncology and Radiology of Serbia: unpublished data on patients treated for thyroid carcinoma from 1992 to 2013). PTC is characterized by multifocality and frequent regional LN metastases [15, 16]. Multifocality either occurs due

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**Table 1** General characteristics on patients, pathological reports’ data and postoperative data from the follow-up period

<table>
<thead>
<tr>
<th>General</th>
<th>Thyroid gland</th>
<th>Regional lymph nodes (LN)</th>
<th>Postoperative</th>
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<tr>
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<td>36</td>
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<td>3</td>
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<td>22</td>
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n, patients’ series; G, gender; F, female; Y, year of operation; FNAB, fine needle aspiration biopsy; PTC, papillary thyroid carcinoma; FL, follicular lesion; FSA, frozen section analysis; Standard, formalin-fixed, paraffin-processed tissue samples; pT, tumor size reported by pathologist; CNG, colloid nodular goiter; HT, Hashimoto’s thyroiditis; LN, lymph nodes; MG, malignant lymph nodes; RAI, postoperative radioiodine therapy
to intraglandular spread from a single primary focus or represents synchronous primary tumors in the thyroid gland [17, 18].

In the experience of the authors, PL is present in 61% of patients [6]. In the available literature, multifocal PTCs with foci in PL were reported in 1 to 3% of patients [5, 6, 11]. Data on isolated, single focus of primary thyroid carcinoma originating from PL are rare. There are two reports by different authors [13, 14], as well as one prospective five-year study by Skilbeck et al. [12]. The extent of the surgery of PL PTC can only be discussed based on individual experiences. Ogawa et al. [13] in 2009 reported a case of follicular thyroid carcinoma localized in PL, 35mm in diameter, surgically treated with PL and isthmus resection and prelaryngeal lymphadenectomy (no metastases found). In 2012, Kim et al. [14] reported what they believed to be the very first case of PTC primarily arising from the PL, 15mm in diameter. They performed a TT with CND and bilateral modified radical neck dissection (MRND), confirming muscle infiltration and bilateral LN metastases. In 2007, Skilbeck et al. [12] reported a series of nine patients with a mass in the midline of the neck, operated within 5-year period, and two of them had single PTC lesion located in isthmus and PL. They were treated with isthmectomy only, but with no data from the follow-up. In addition, a case of PTC recurrence in a remnant PL one year after initial TT was reported by Lee et al. in 2011 [8]. Patient was re-operated and pathology confirmed LN metastases in right jugulo-carotid region. We had 3 cases of PTC single focus in PL in a 10-year period. Primary tumors were encapsulated, less than 20mm in diameter. Clinically, they appeared as a palpable, rigid mass, visible in the midline of the neck and FNAB showed lesion suspicious for PTC. We performed TT to exclude PTC multifocality [17, 19], to prevent PTC recurrence, especially non-differentiated, anaplastic carcinoma in thyroid remnant [7, 8, 17, 18] and to increase the sensitivity of serum thyroglobulin in the follow-up period [10].

The optimal extent of neck dissection is always debatable, as well as the role of ultrasound (US) and computerized tomography (CT) in preoperative evaluation of LNs. Roh et al. [20] showed US specificity over 85% in all regions and levels of the neck. Lee et al. [21] showed poor sensitivity of US and CT in central compartment, but proved these methods as useful in evaluation of lateral compartment LNs. However, lateral microscopic metastases can easily be overlooked by imaging methods [15, 22, 23]. In our study, the only metastatic site of PL PTC was the Delphian LN of one patient. In the recent work published by Oh et al. [24] it has been shown that PTC metastasis in Delphian LN predicts the presence of central LN metastases and the authors recommend CND. Also, these patients are more likely to have lateral LN metastases. Initial CND prevents central recurrence of the malignant disease [25-27]. Re-operations in central compartment, in comparison to initial surgery, more often lead to persistent hypoparathyroidism and RLN injury [16, 28-30]. On the other hand, there are no differences in the rates of permanent hypoparathyroidism or RLN injury between groups of patients with and without initial CND [31]. Metastatic LNs can be found in jugulo-carotid regions’ level III or IV in approximately 70% of patients with PTC [15, 16, 32]. Mazzaschi et al. [33] report high prevalence of positive lateral LNs in patients with positive central LNs, and low prevalence of “skip” metastases in negative central LNs. This suggests that lateral neck dissection may be unnecessary in patients with negative level VI LNs, unless lateral compartment metastases are clinically or US verified. Our surgical strategy in managing lateral neck compartment is based on sentinel LN biopsy as a standard procedure for PTC in our institution [34]. If sentinels are proven to be malignant, levels II - V dissection is performed - otherwise, no MRND is necessary [30, 34]. In our study, all analyzed sentinels were benign (both in frozen section and standard pathology), thus no MRND was performed.

Isthmectomy with resection of PL is justified surgical treatment for PL PTC as well, due to favorable prognosis of this entity and low recurrence rate, according to available literature [8, 12-14]. It is, however, mandatory to follow up the patients. In case of disease recurrence, re-operation is mandatory. The risk of persistent hypoparathyroidism and RLN injury is equal to the initial surgery, since neither RLN, nor parathyroid glands were risk exposed during the previous procedure.

Our research confirms previous findings on rare appearance of single PTC focus in PL. In our series, all tumors were staged as T1 and the only LN proven to harbor metastasis was prelaryngeal LN in one patient, while all other LNs from central and lateral compartments were benign. All patients were disease free in the follow-up. Lesions in pyramidal lobe of thyroid gland are easy to diagnose because of their accessibility to palpation and FNAB. The extent of the surgery
is controversial and only individual experiences can be discussed. We perform total thyroidectomy and central neck dissection (uni- or bilateral), with sentinel lymph node biopsy in level III/IV of both jugulo-carotid regions as a determination factor for radical neck dissection. This strategy provides more precise disease staging, may decrease the risk of recurrence and improve patients’ survival.

Disclosure

None of the authors have any potential conflicts of interest associated with this research.

References


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