Imprint Cytology from a Childhood Case of Metastatic Papillary Thyroid Carcinoma†

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Abstract

A 9-year-old girl with a history of a palpable multinodular hard mass in the right lobe of the thyroid gland was biopsied. On diagnosis of a papillary carcinoma, total thyroidectomy and right radical neck dissection were performed. Examination of frozen sections demonstrated metastsis in the right but not the left cervical lymph nodes. Imprint cytology revealed small papillary sheets of neoplastic cells with a high proportion of cytoplasmic inclusions and a few nuclear grooves. These nuclear details allowed a specific diagnosis of metastatic papillary thyroid carcinoma. Papillary thyroid carcinoma can be easily diagnosed by imprint cytology. In places such as small and country hospitals that do not have pathology laboratories, it can also be used successfully as an alternative to frozen section histology. The efficiency, simplicity and rapidity of this method make it a very useful procedure.

Key word : Imprint Cytology, Papillary Carcinoma, Metastatic, Thyroid, Childhood, Lymph Node

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J Med Assoc Thai 2000; 83: 348-351

Intraoperative cytology is becoming more accepted among surgical pathologists as an adjunct to examination of frozen sections. The large number of recent books and original articles on this subject attest to its increasing popularity[1-4]. Using Wright, Giemsa and Papanicolaou stains on touch imprints of tumors, the pathologist can better appreciate the cytologic features.

Thyroid carcinoma occurs rarely in children younger than 16 years. The prognosis after appropriate treatment is relatively good but local and distant recurrence may present a problem even after several years[5-7]. Cervical lymph node metastases are frequently found in patients with extrathyroidal spread of papillary carcinoma. The mean relative incidence of papillary carcinoma in chil-

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† Presented at the 5th Congress Asia Pacific Association of Societies of Pathologists and the 9th National Congress of Pathology, Bangkok, Thailand, December 2-5, 1997.

dren is 72 per cent and incidence of death ranges from 0 per cent to 8 per cent[8].

In this case report, we describe the imprint cytology from a frozen section, a frozen sections and permanent histology of metastatic papillary thyroid carcinoma in childhood.

CASE REPORT

A 9-year-old girl was referred from a rural hospital because of a mass in the right lobe of her thyroid gland that she had for two years. The mass was hard and multilobular, but there were no palpable lymph nodes. The patient had normal vital signs. She had been treated with Anhydrous Thyroxine Na (Eltroxin), but the mass continued to grow. Surgeons at the rural hospital had tried to do a thyroidectomy but failed because of marked fibrosis and hypervascularity. However, a biopsy was performed and a papillary carcinoma of the thyroid gland was diagnosed. The patient was, therefore, referred to our hospital for definite treatment. Slight tachycardia and fine tremor were noted on admission. The surgical wound was evident in the low anterior cervical region. At this time, the thyroid gland was 5.5 x 5.5 cm. with palpable lymph nodes along the right and left jugular chain, the largest being 3 cm in diameter. A total thyroidectomy and right radical neck dissection were carried out. During the operation, multiple nodules were noted in the right lobe with invasion of strap muscle and loss of tracheal cartilage on the right side of the trachea. Frozen sections were taken and metastases were found only in the lymph nodes of the right jugular chain. Lymph node imprints from frozen section were also performed. The patient tolerated the operation well and was discharged from the hospital 1 week later.

Pathologic Observations

Histopathological assessment of frozen sections of the right cervical lymph nodes showed a follicular arrangement of tumor cells without papillary structures. A definite diagnosis could not be established because of poor nuclear details in the frozen preparation, but in combination with the imprint cytology, a pathological diagnosis of a metastatic carcinoma was made. This was most likely a follicular variant of the papillary carcinoma (Fig. 1). Cytological finding consisted of many malignant cells. They were arranged in small papillary sheets, monolayers or dispersed. At high-power, cells in

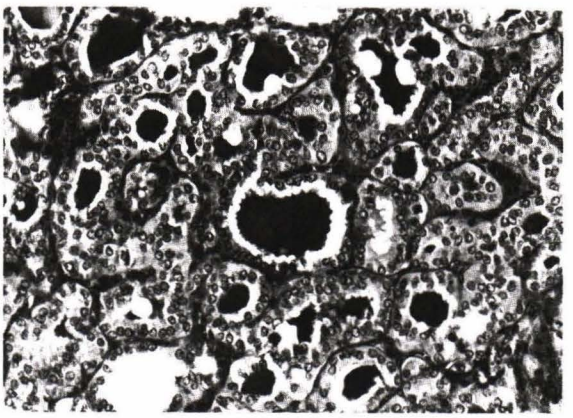

Fig. 1. Permanent section of a lymph node showing a follicular variant of a papillary carcinoma (hematoxylin & eosin X 200).

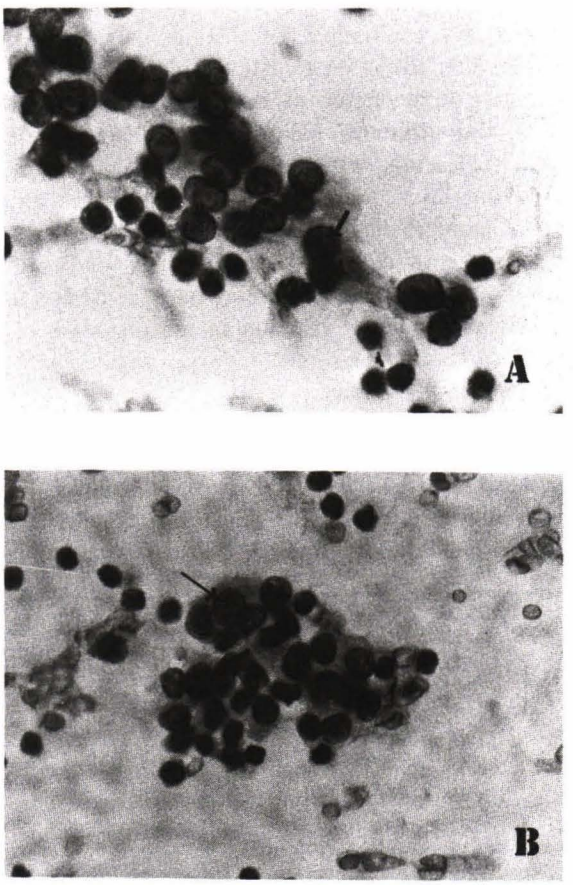

Fig. 2. High-power micrographs of monolayered sheets showing (A) palisading and intranuclear cytoplasmic inclusions (large arrows) (B) nuclear grooves (small arrows) (Papanicolaou stain, X 600).

monolayer sheets showed palisaded nuclei and a high proportion of intranuclear cytoplasmic inclusions (Fig. 2A) and a few nuclear grooves (Fig. 2B). These nuclear details lead to a specific diagnosis of a metastatic papillary thyroid carcinoma. Right lobectomy was undertaken and the lobe was sent to the pathological laboratory one day later. Histology showed tumor nodules with branching papillary fronds containing a central core of fibrovascular stroma. The lining epithelium was single-layered with ground-glass nuclei. The final diagnosis was papillary carcinoma with metastasis to the right cervical lymph nodes.

DISCUSSION

The papillary form of thyroid carcinoma is overwhelmingly predominant in children compared to other histologic patterns. It is the easiest of tumors to diagnose by fine needle aspiration biopsy. A papillary carcinoma has distinct morphologic features that allow for a cytologic diagnosis with a relatively high degree of accuracy[9]. In typical cases, three-dimensional papillary clusters with nuclear clearing, intranuclear cytoplasmic inclusions and less commonly psammoma bodies are seen. Cytologic diagnosis may be difficult while in the absence of these features. In many studies it was shown that nuclear grooving may be used as a reliable morphologic criterion in the diagnosis of papillary carcinoma of the thyroid in tissue sections and imprint smear[10-12].

The imprint cytology technique is simple, fast and inexpensive. Pathologists can make a cytodiagnosis while waiting for the frozen sections. In the present case report, imprint cytology from a frozen section allowed definite diagnosis from nuclear details in contrast to frozen sections which only demonstrated follicular patterns. The combination of the cytologic examination and the frozen sections, supported by clinical data and gross examination, yielded results superior to those obtained by either a cytologic or frozen section examination alone. Because freezing artifacts are avoided, the level of cytologic details provided by the intraoperative cytologic specimen technique is superior to that provided by frozen sections in cases that lack papillary structure. A classic example is the papillary carcinoma of the thyroid, in particular the follicular variant, the nuclear features of which (intranuclear inclusions and grooves) are more readily recognized on cytologic smears than on frozen sections. It has been emphasized in many reports that the combination of both gives the utmost accuracy[1,2,4].

It is clear that imprint cytology is a quick and simple method with wide applicability for histopathologic diagnosis of lesions from many organs [4,13,14]. In places such as small and country hospitals where a pathology laboratory is not available, imprint cytology can also be used successfully as an alternative to frozen section histology. The efficiency, simplicity and rapidity of this method makes it a very useful procedure. However, the accuracy of imprint cytologic diagnosis depends on the experience of pathologists and cytotechnologists.

ACKNOWLEDGMENTS

The authors wish to thank Dr. Banchob Sripa for his help with the photographs, Dr. J. Guy Edwards and Dr. Malcolm Moore for their help with the manuscript and Sudawan Srikammoong for typing it.

(Received for publication on July 7, 1998)

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เซลล์วิทยาอิมพรินท์ของมะเร็งต่อมธัยรอยด์ที่แพร่กระจายมาที่ต่อมน้ำเหลือง†

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ผู้ป่วยเด็กหญิงอายุ 9 ปี มาด้วยประวัติมีก้อนที่ต่อมธัยรอยด์ข้างขวา จากการตัดชิ้นเนื้อส่งตรวจทางพยาธิวิทยาได้รับการวินิจฉัยเป็นมะเร็งแป้บปิลลารี่ จึงได้ทำการผ่าตัดต่อมธัยรอยด์และต่อมน้ำเหลืองบริเวณคอส่งตรวจชิ้นเนื้อเยือกแข็ง (frozen section) และได้ทำการตรวจเซลล์มะเร็งโดยวิธีอิมพรินท์ (imprint cytology) จากต่อมน้ำเหลืองขณะทำการผ่าตัด พบเซลล์มะเร็งแป้บปิลลารี่แพร่กระจายมาที่ต่อมน้ำเหลืองบริเวณคอข้างขวา การตรวจทางเซลล์วิทยาอิมพรินท์พบเซลล์มะเร็งเรียงตัวเป็นแป้บปิลลารี่ ภายในนิวเคลียสมีช่องว่างใส (cytoplasmic inclusion) จำนวนมากและมีรอยสันที่นิวเคลียส (nuclear groove) จำนวนเล็กน้อย ลักษณะของนิวเคลียสและการเรียงตัวของเซลล์สามารถให้การวินิจฉัยเป็นมะเร็งแป้บปิลลารี่ของต่อมธัยรอยด์ได้ง่ายจากการตรวจเซลล์วิทยาอิมพรินท์ โรงพยาบาลขนาดเล็กที่ไม่มีห้องปฏิบัติการพยาธิวิทยาสามารถใช้เซลล์วิทยาอิมพรินท์แทนการตรวจชิ้นเนื้อเยือกแข็งหรือใช้ร่วมกับการตรวจชิ้นเนื้อเยือกแข็งได้ เพราะเป็นวิธีที่ทำง่าย สะดวก รวดเร็ว และได้ผลการวินิจฉัยที่ค่อนข้างแม่นยำ

คำสำคัญ : เซลล์วิทยาอิมพรินท์, มะเร็ง, แพร่กระจาย, ต่อมธัยรอยด์, เด็ก, ต่อมน้ำเหลือง

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จดหมายเหตุทางแพทย์ ฯ 2543; 83: 348–351

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† ได้เสนอผลงานในการประชุมวิชาการพยาธิวิทยาแห่งชาติ ครั้งที่ 9 กรุงเทพ ฯ 2–5 ธันวาคม 2540