Current Diagnostic Pathology (2006) 12, 40–53

Current
DIAGNOSTIC
PATHOLOGY

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MINI-SYMPOSIUM: HEAD AND NECK PATHOLOGY

Sinonasal carcinomas

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KEYWORDS
Sinonasal;
Squamous cell carcinoma;
Nasal;
Neuroendocrine carcinoma;
Basaloid squamous cell carcinoma;
Lymphoepithelial carcinoma;
Olfactory neuroblastoma;
Sinonasal undifferentiated carcinoma

Summary Malignant neoplasms of the sinonasal tract encompass a wide variety of epithelial, lymphoid and mesenchymal tumours. The separation and classification of epithelial or neuroepithelial tumours is sometimes challenging, especially when treatment and prognosis are different. Squamous cell carcinoma, keratinizing or non-keratinizing and, usually, the poorly differentiated type need to be separated from sinonasal undifferentiated carcinoma, lymphoepithelial carcinoma, neuroendocrine carcinoma and olfactory neuroblastoma. Whereas melanoma and lymphoma are also included in the broad differential, along with primitive neuroectodermal tumours and rhabdomyosarcomas, the focus of this commentary will be to present the major clinical, radiographical, histological, immunohistochemical, ultrastructural and molecular features which allow for separation of the principle mucosal epithelial neoplasms of the sinonasal tract.

Introduction

Malignant sinonasal tract tumours comprise <1% of all neoplasms and about 3% of those of the upper aerodigestive tract.[1] Squamous cell carcinoma (SCC) and adenocarcinoma are strongly associated with environmental factors, including tobacco, alcohol and occupational exposure (e.g. to heavy metal particles such as nickel and chromium) and with workers in the leather, textile, furniture and wood industries.[1–5]

Sinonasal tract malignancies most commonly affect the maxillary sinus (about 60%), followed by the nasal cavity (about 22%), ethmoid sinus (about 15%) and frontal and sphenoid sinuses (<3%). Sinonasal tract tumours are diverse, with the majority being SCC and its variants (55%), followed by non-epithelial neoplasms (20%), glandular tumours (15%), undifferentiated carcinoma (7%) and miscellaneous tumours (3%).[1,3–5] Carcinoma of the nasopharynx differs in many aspects from that of the nasal cavity and paranasal sinuses and will not be discussed herein. Furthermore adenocarcinomas including salivary gland-type carcinomas and non-epithelial tumours will not be discussed.

The clinical presentations, radiological features and pattern of tumour spread for SCC, adenocarcinoma and most of the other malignant neoplasms of the sinonasal tract are similar. Gross appearance of

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0968-6053/$ - see front matter © 2005 Elsevier Ltd. All rights reserved.
doi:10.1016/j.cdip.2005.10.009

the sinonasal tract and nasopharyngeal malignancies has limited value in aiding diagnosis, because the initial diagnosis depends on the tissue obtained by endoscopy or polypectomy. The treatment of choice for most sinonasal tract carcinomas is surgical resection with clear margins.[1,3–5] The following discussion will focus on the specific clinical, radiographical and diagnostic criteria used in the separation of selected carcinomas of the sinonasal tract, specifically sinonasal undifferentiated carcinoma (SNUC), small cell carcinoma, lymphoepithelial carcinoma (nasopharyngeal-type) and neuroendocrine carcinoma (Table 1). In this context, a brief discussion about SCC is necessary to establish the criteria for separation from these different tumour types.

Squamous cell carcinoma

Clinical features

SCC has a male predilection (2:1), with a peak incidence in the sixth–seventh decades. The location, in the order of frequency, is maxillary sinus, nasal cavity, ethmoid sinus, frontal sinus and sphenoid sinus.[1,3–5] Early diagnosis is difficult

Table 1 Comparison of sinonasal malignant neoplasms.

Feature	Squamous cell carcinoma	Sinonasal undifferentiated carcinoma	Lymphoepithelial carcinoma	Neuroendocrine carcinoma	Olfactory neuroblastoma
Mean age (years)	55–65	55–60	40–60	50	40–45
Site	Nasal cavity and/or sinuses	Multiple sites usually	Nasal cavity > sinuses	Superior/posterior nasal cavity, ethmoid, maxillary sinuses	Roof of nasal cavity
Radiographical studies	Little destruction/spread	Marked destruction/spread	May invade palate, orbit, base of skull	May invade skull base or orbit	'Dumbbell-shaped' cribriform plate mass
Prognosis	60% 5-year (stage and tumour type dependent)	<20% 5-year survival	Favourable with radiotherapy	>60% die of disease	60–80% 5-year survival
Cranial nerve involvement	Uncommon	Common	Can be present	Uncommon	Sometimes
Pattern	Syncytial	Sheets and nests	Islands, sheets	Ribbons, islands	Lobular
Cytology	Squamous differentiation, keratinization, opaque cytoplasm	Medium cells, inconspicuous nucleoli	Large, vesicular nuclei and prominent nucleoli	Salt and pepper, granular chromatin	Salt and pepper chromatin, small nucleoli (grade dependent)
Anaplasia	Present	Common	Syncytial with moderate atypia	Moderate	Occasionally and focally
Mitotic figures	Present	High	Present	High	Variable
Necrosis	Limited	Prominent	Focal to absent	Prominent	Occasionally
Vascular invasion	Rare	Prominent	Uncommon	Present	Occasionally
Neurofibrillary stroma	Absent	Absent	Absent	Absent	Common
Pseudorosettes	Absent	Absent	Absent	Present	Common
Keratin	Positive	>90%	Positive	Positive	Focal, weak
CK 5/6	Present	Negative	Positive	n/a	Negative
EMA	Present	50%	Positive	n/a	Negative
NSE	Negative	50%	n/a	Positive	>90%
S-100 protein	Negative	<15%	n/a	Positive	+ (sustentacular)
Synaptophysin	Negative	<15%	Negative	Positive	>90% (can be weak)
In situ EBER	Absent	Absent	Positive	Absent	Absent
Neurosecretory granules (EM)	Absent	Rare	Absent	Present	Numerous

EMA, Epithelial membrane antigen; NSE, neuron-specific enolase; EBER, Epstein–Barr virus encoded early RNA; EM, electron microscopy.