

## CASE REPORT

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**Submandibular gland metastasis of breast carcinoma: a case report and review of the literature**

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**Abstract** We report a female patient who developed a solitary metastasis in the submandibular salivary gland 2 years after primary surgery for a grade II T1 N0 M0 breast cancer. A review of the literature shows that metastases in the submandibular gland are uncommon but when they arise the site of the primary tumour is more likely to be distant than in the head and neck region. In female patients, breast tumours predominate.

**Key words** Submandibular · Metastasis · Breast

**Introduction**

Metastatic spread restricted to major salivary glands is an uncommon disorder. The parotid gland is most frequently involved followed by the submandibular gland whereas, to the best of our knowledge, metastases involving the sublingual gland have not been reported.

Here we have reported a case of ductal carcinoma of the breast which spread to the ipsilateral submandibular gland.

**Case report**

A 49-year-old woman was admitted to hospital with a swollen left submandibular gland. She had previously had a lobectomy of the thyroid gland for a follicular adenoma and a quadrantectomy plus axillary node dissection for an infiltrating ductal carcinoma (T1 N0 M0) of the left breast, 5 and 2 years before, respectively. The left submandibular gland was resected and yielded a specimen measuring 2.8×2×1.6 cm, weight 15 g. Towards the centre was a whitish firm irregular nodule of 1.7 cm in maximum diameter. The tumour was composed of solid nests broadly infiltrating the submandibular gland and the surrounding soft tissues. The nodule was purely in the submandibular gland parenchyma. No lymphoid tissue was identified.

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The bulk of the tumour showed diffuse fibrosis, while the periphery had stellate margins with bud-like projections infiltrating the salivary tissue. Normal ducts and acini were occasionally surrounded, but not penetrated, by the neoplastic cells (Fig. 1a, b). No foci of ductal carcinoma in situ were observed.

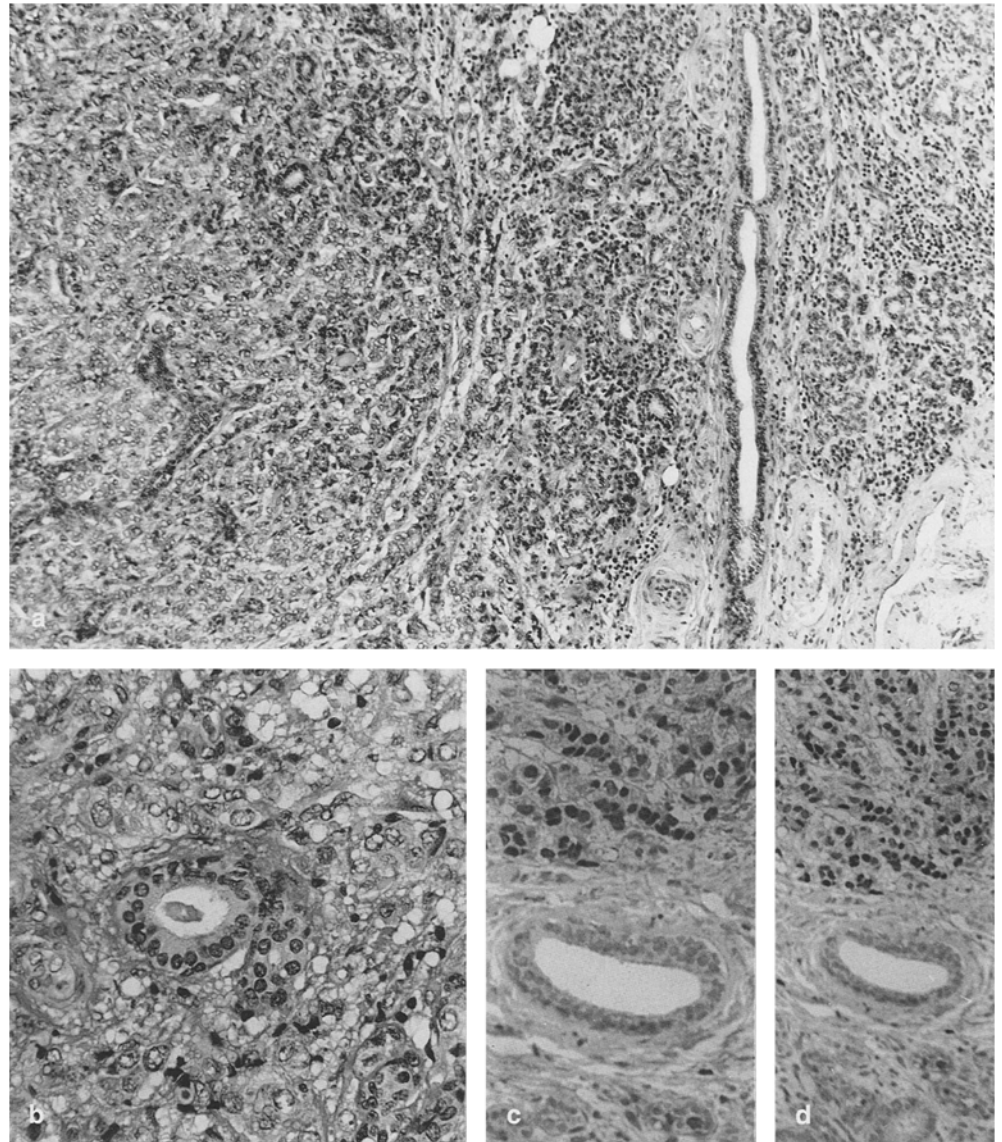
The tumour was immunostained for estrogen and progesterone receptors using commercially available monoclonal antibodies (clones 1D5 for ER-ICA and 1A6 for PgR-ICA, Dako, Denmark, DBA, Italy). The majority of tumour cells (80%) revealed strongly positive nuclear immunoreactivity (Fig. 1c, d); the acinar and ductal structures of the submandibular gland did not react. Comparison between the submandibular tumour and the breast carcinoma resected 2 years previously revealed very similar morphological features. Furthermore the estrogen and progesterone receptor immunostaining was also similar (Fig. 2a–c). The tumour was considered a metastasis of the breast carcinoma. The patient was alive and free of disease 3 months after surgery, when she was lost to our follow-up.

**Discussion**

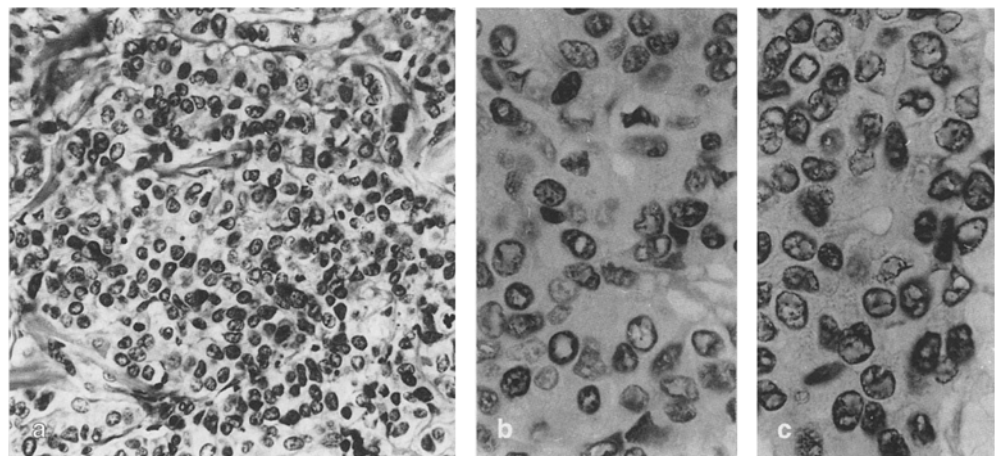
A review of the literature has revealed approximately 100 cases of metastases to the submandibular gland [1, 3, 4, 6, 9–12, 15, 17–21, 23–25]. In the largest series ( $n=73$ ) from the Armed Forces Institute of Pathology [12] the site of the primary tumour was known in only 14 patients (19%). In 6 (43%) of these 14 patients the primary tumour was found in the head and neck, while in the rest, 8 (57%) arose from distant sites. Review of a further 30 cases from another study revealed similar data showing even higher percentage (73.3%) of metastases to the submandibular gland from distant sites versus only 13.3% from the head and neck region (in 13.3% of cases the primary site was unknown) [12]. This finding contrasts with metastases in the parotid gland where the majority (64%) are reported to arise from primary tumours in the head and neck [12].

Concentrating our attention on these 31 cases (including the patient reported in this paper) of metastases from a site distant to the head and neck, we have highlighted a group of 14 patients (45%), all women, whose metastases originated from breast carcinoma [4, 11, 12, 18–21, 24]. This indicates the very high change of a breast origin in female patients with metastasis to the submandib-

**Fig. 1** **a** Submandibular gland metastasis of breast carcinoma: solid nests of tumour cells (*left*) infiltrate the submandibular gland (*right*) (H & E,  $\times 250$ ). **b** Higher magnification showing salivary duct surrounded, but not infiltrated by the neoplastic cells (H & E,  $\times 400$ ). **c** Most tumour cells show positive nuclear immunoreactivity for estrogen (HRP, ER-ICA 1D5,  $\times 400$ ) and **d** progesterone (HRP, PgR-ICA 1A6,  $\times 300$ ) receptors



**Fig. 2** Primary carcinoma of the breast removed 2 years previously. **a** Tumour cells display similar features to submandibular metastasis (H & E,  $\times 400$ ) as well as similar immunostaining for **b** estrogen (HRP, ER-ICA 1D5,  $\times 400$ ) and **c** progesterone (HRP, PgR-ICA 1A6,  $\times 400$ ) receptors



ular gland. The other sites ( $n=17$ ) (e.g. lung, kidney, bladder, colon) are evenly divided between male and female patients.

Non-head and neck tumours (renal, lung, breast) have histological features similar to certain primary salivary gland tumours. In particular salivary duct carcinoma, a recently recognized carcinoma of the salivary glands with highly aggressive clinical behaviour, is morphologically indistinguishable from ductal carcinoma of the breast [22]. To differentiate between the two conditions on histological grounds alone is difficult. The presence of intraductal component as well as extension of tumour cells within the basal membrane of a normal duct and acini may favour a primary submandibular gland tumour [8]. Furthermore, the location of the tumour may be an important indicator given that salivary duct carcinoma is more commonly seen in the parotid gland although 9 cases in the submandibular gland have also been reported [5, 7, 14, 16]. Immunocytochemistry may be helpful for differential diagnosis. Although positive estrogen and progesterone receptors staining have been reported in primary salivary gland carcinomas [2, 13] only a few cells stained positively compared to breast carcinomas where often 90–100% of cells may stain positively. The strong immunoreactivity of tumour cells for estrogen and progesterone receptors, the absence of intraductal component, along with the extra-parotid location and, the clinical history of breast carcinoma, has given substantial support for the diagnosis. It appears that when submandibular metastasis occurs in a female patient, the primary tumour is probably to be found in the breast.

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