

# Squamous Cell Carcinoma Derived from a Skin Flap Used for Reconstruction of the Hypopharynx

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**Development of a secondary primary cancer in a skin flap is a rare complication. A 70-year-old man underwent partial laryngopharyngectomy, right neck dissection and reconstruction with a radial forearm free flap in 2004. Five years later, an exophytic tumor was found on the hypopharynx reconstructed with the radial forearm free flap. He underwent total laryngopharyngectomy, left neck dissection and reconstruction with a jejunal free flap in June 2009. Pathological findings suggested this was a primary cancer rather than a metastasis. Localization to the epidermis and dermis indicate that the tumor was derived from the surface of the skin flap.**

Key words: flap; hypopharynx; secondary primary cancer; squamous cell carcinoma

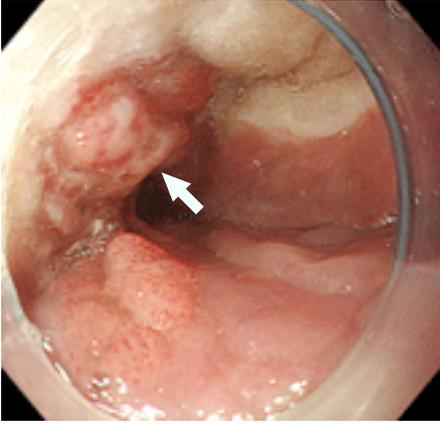
Various flaps are used to reconstruct the defect after resection of head and neck cancer, and these are associated with complications such as ischemia of a free flap, infection, fistula and stenosis. However, the development of a secondary primary cancer in a flap is rare (Genden et al., 2004). Recurrence of the original primary tumor usually occurs in residual mucosa of the pharynx or oral cavity. In the present report, we described a case of a male patient with a secondary primary squamous cell carcinoma which arose in a skin flap 5 years after the initial treatment of hypopharyngeal cancer. Pathological features and therapeutical procedures of the squamous cell carcinoma were minutely presented.

## Patient Report

A 70-year-old man was admitted to Shikoku Cancer Center in 2004 for treatment of squamous

cell carcinoma of the right pyriform sinus of the hypopharynx (T2N0M0). He underwent partial laryngopharyngectomy, right neck dissection and reconstruction with a radial forearm free flap. We confirmed complete resection of the tumor by pathological examination. The patient was discharged without postoperative radiation therapy and had regular follow-up thereafter. The patient stopped smoking and drinking after the 1st surgery in 2004. Five years later, in April 2009, he noticed a mass in the anterior neck and visited our hospital in May. Ultrasonography showed that this tumor was located anterior to the thyroid cartilage and was 4 cm in diameter. Cytologic examination of a fine-needle aspiration specimen revealed squamous cell carcinoma. Flexible fiberoptic laryngoscopy revealed no tumor in the pharynx or larynx. Gastrointestinal endoscopy detected an exophytic tumor in the hypopharynx. This tumor was located at

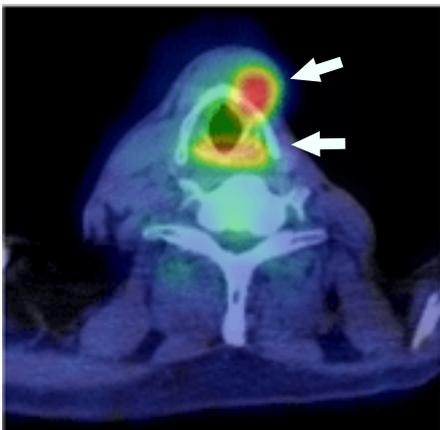
Abbreviations: MRI, magnetic resonance imaging; PET/CT, positron emission tomography with computed tomography



**Fig. 1.** Gastrointestinal endoscopy detected an exophytic tumor in the hypopharynx. This tumor was located at the apex of the right pyriform sinus that had been reconstructed with a radial forearm free flap (arrow).



**Fig. 2.** MRI demonstrated only the anterior cervical cancer, which was external to the thyroid cartilage, away from the hypopharynx (arrow). MRI, magnetic resonance imaging.



**Fig. 3.** PET/CT detected both hypopharyngeal cancer and anterior cervical cancer (arrows). PET/CT, positron emission tomography with computed tomography.

the apex of the right pyriform sinus reconstructed with the radial forearm free flap (Fig. 1). No other tumor was present in the pharyngeal or esophageal mucosa. Endoscopic biopsy of the hypopharyngeal tumor was performed, leading to a diagnosis of squamous cell carcinoma. Magnetic resonance imaging (MRI) demonstrated only the anterior cervical cancer, and this was located outside the thyroid cartilage, away from the hypopharynx (Fig. 2). Positron emission tomography with computed tomography (PET/CT) detected both the hypopharyngeal and anterior cervical tumors (Fig. 3) but showed no distant metastasis. The patient was diagnosed with a secondary primary cancer on the skin flap and cervical recurrence of hypopharyngeal cancer.

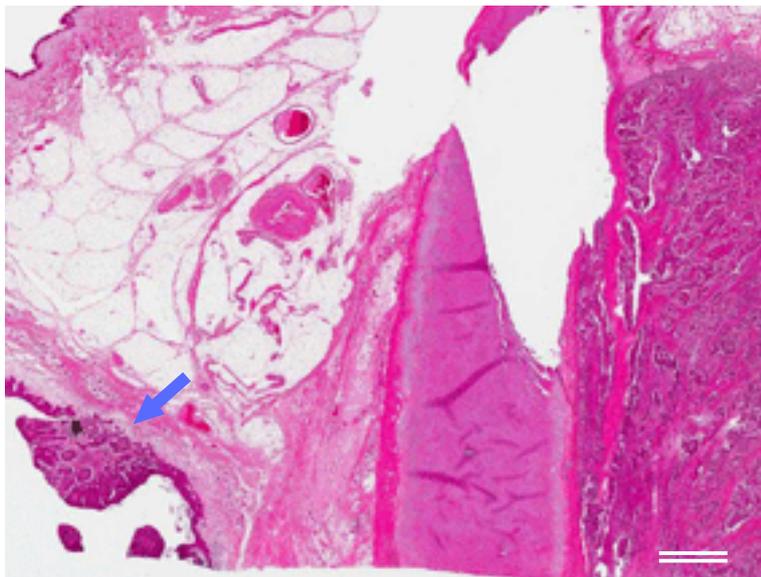
MRI and PET/CT suggested the anterior cervical cancer was adherent to the thyroid cartilage, so we decided that the larynx could not be preserved. We therefore performed total laryngopharyngectomy, left neck dissection and reconstruction with a jejunal free flap in June 2009. Postoperation radiotherapy was performed with a total dose of 60 Gy.

### ***Pathological findings***

The hypopharyngeal cancer was separate from the anterior cervical cancer and was localized to the right pyriform sinus reconstructed with the 1.0-cm diameter skin flap (Fig. 4). It showed exophytic



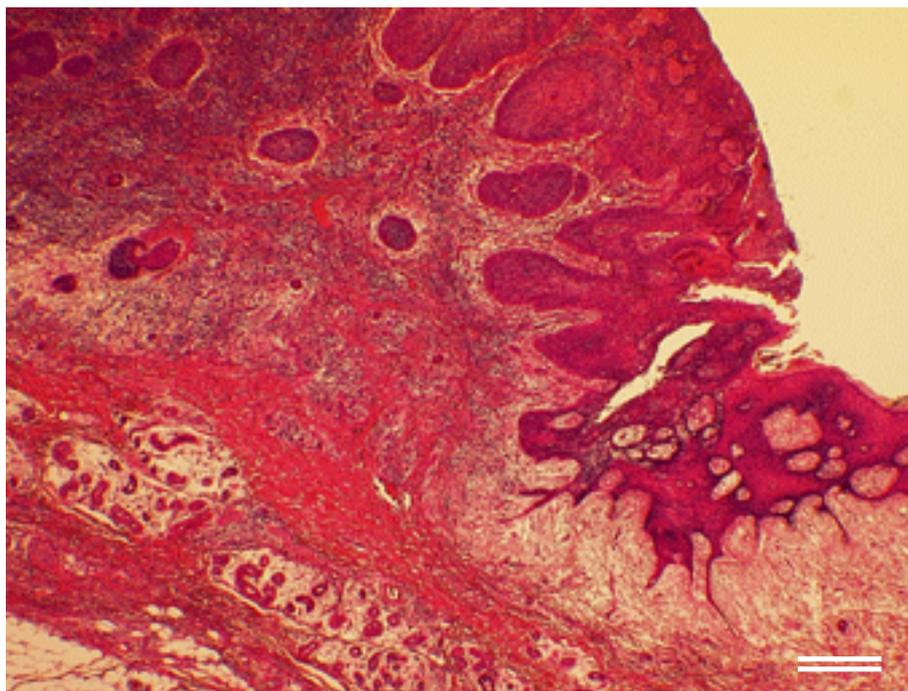
**Fig. 4.** Hypopharyngeal cancer localized to the right pyriform sinus reconstructed with the 1.0-cm diameter skin flap (arrow).



**Fig. 5.** The hypopharyngeal cancer shows exophytic growth from the skin flap (hematoxylin and eosin). Bar = 3 mm.

growth from the skin flap (Fig. 5). Most of the tumor was contained within the epidermis and dermis of the skin flap, with little in the subcutaneous tissue. No tumor was present in the pharynx, larynx or cervical esophageal mucosa of the resected specimen. This tumor was diagnosed as well-differentiated squamous cell carcinoma (Fig. 6).

The anterior cervical cancer was located anterior to the thyroid cartilage with little invasion, and measured 5.2 × 3.0 × 2.4 cm. It extended to the pre-epiglottic space and reached the first tracheal cartilage without invasion of the thyroid gland. Pathological diagnosis was poorly differentiated squamous cell carcinoma. No metastatic lymph nodes were found.



**Fig. 6.** Most of the cancer was localized to the epidermis and dermis of the skin flap, with little in the subcutaneous tissue. It was diagnosed as well-differentiated squamous cell carcinoma (hematoxylin and eosin). Bar = 340  $\mu$ m.

## Discussion

Pathological findings suggested that the skin flap tumor was a primary cancer rather than a metastasis. Localization to the epidermis and dermis showed that this cancer was derived from the surface of the skin flap. In contrast, metastatic skin cancer usually occurs in subcutaneous tissue, and leaves the epidermis intact (Reingold, 1966). The development of a secondary primary cancer in a flap is rare. Several factors were reported to cause this complication, including chronic irritation that the skin does not suffer at its normal site, for example, from smoking, drinking and food (Monnier et al., 2008; Woolgar and Triantafyllou, 2009).

The present patient stopped smoking and drinking after the 1st surgery in 2004, and cancer of the skin flap was detected 5 years later. Hence, physical or chemical stimulation from food, saliva or stomach acid might have been involved in carcinogenesis. In an autopsy case of squamous cell carcinoma derived from a reconstructed esophagus, papillomatous cancer developed in the epithelium of the skin tube, which demonstrated hyperkeratosis, papillomatous proliferation and severe anaplasia (Kanisawa et al., 1959). The authors considered that carcinogenesis had resulted from stimulation by food and drink.

In the present patient, the cancer developed 5 years after the 1st surgery, which seems to be a relatively short period. The latency of 6 to 40 years was reported between reconstructive surgery and development of cancer in the skin flap (Johnson et al., 1983; Deans et al., 1990; Scott and Klaassen, 1992; Sa'do et al., 1994; Iseli et al., 2002). But the period of carcinogenesis is unknown. In treating him, we performed total laryngopharyngectomy and reconstruction with a jejunal free flap because the anterior cervical cancer was adherent to the thyroid cartilage. Cancer of the skin flap tends to be localized to the surface of the flap, and could often be removed by partial resection of the flap (Yoshino et al., 1989). Skin flap-derived cancer is a rare complication with an unknown period of car-

cinogenesis. Careful and long-term observation of patients contributes to improving prognosis of the disease.

## References

- 1 Deans JA, Hill J, Welch AR, Soames JV. Late development of a squamous carcinoma in a reconstructed pharynx. *J Laryngol Otol* 1990;104:827–828.
- 2 Genden EM, Rinaldo A, Suarez C, Wei WI, Bradley PJ, Ferlito A. Complications of free flap transfers for head and neck reconstruction following cancer resection. *Oral Oncol* 2004;40:979–984.
- 3 Iseli TA, Hall FT, Buchanan MR, Kleid SM. Squamous cell carcinoma arising in the skin of a deltopectoral flap 27 years after pharyngeal reconstruction. *Head Neck* 2002;24:87–90.
- 4 Johnson FE, Chang PK, Huvos AG, Strong EW. Neoplastic changes in transposed deltopectoral skin. *Arch Otolaryngol* 1983;109:407–409.
- 5 Kanisawa M, Homma Y, Suzuki K, Katayama T. An autopsy case of squamous cell carcinoma derived from reconstructed esophagus. *Acta Pathol Jpn* 1959;9(Suppl):843–849.
- 6 Monnier Y, Pasche P, Monnier P, Andrejevic-Blant S. Second primary squamous cell carcinoma arising in cutaneous flap reconstructions of two head and neck cancer patients. *Eur Arch Otorhinolaryngol* 2008;265:831–835.
- 7 Reingold IM. Cutaneous metastases from internal carcinoma. *Cancer* 1966;19:162–168.
- 8 Sa'do B, Nakamura N, Higuchi Y, Ozeki S, Harada H, Tashiro H. Squamous cell carcinoma of the oral cavity derived from a skin graft: a case report. *Head Neck* 1994;16:79–82.
- 9 Sakamoto M, Nibu K, Sugawara M, Nakatsuka T, Harii K, Ichimura K. A second primary squamous cell carcinoma arising in a radial forearm flap used for reconstruction of the hypopharynx. *ORL J Otorhinolaryngol Relat Spec* 1998;60:170–173.
- 10 Scott MJ, Klaassen MF. Squamous cell carcinoma in a tube pedicle forty years after jaw reconstruction. *Br J Plast Surg* 1992;45:70–71.
- 11 Woolgar JA, Triantafyllou A. Histological changes in intra-oral skin flaps. *Head Neck Oncol* 2009;1:2.
- 12 Yoshino K, Satou T, Umatani K, Fujii T, Hatta T. A case of squamous cell carcinoma originated in the transferred skin flap after resection of hypopharynx carcinoma. *Otolaryngol-HNS* 1989;61:1127–1130.

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