CASE REPORT

Nodular fasciitis of the masseter

Satish Babu, Robert Nash, Ravikiran Shenoy, Justin Weir

Imperial College Healthcare
NHS Trust, London, UK**Correspondence to**
Satish Babu,
sbabu@doctors.org.uk

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SUMMARY

A 73-year-old man presented to ENT clinic with a painless, smooth lump overlying his right cheek. Fine needle aspiration wrongly diagnosed necrotising malignancy with squamous differentiation. MRI showed a lesion overlying the right masseter, and positron emission tomography scanning incorrectly suggested this was a metabolically active lymph node. After surgical excision, immunohistochemical analysis showed this was in fact nodular fasciitis of the masseter. Nodular fasciitis is a rare, benign, proliferative lesion whose clinical and histological features make it difficult to distinguish from malignancies such as sarcoma. Immunohistochemical analysis for markers including vimentin and actin is crucial for diagnosis. Without this, misdiagnoses are common and patients are at risk of unnecessarily aggressive treatment. This case report summarises the epidemiological, aetiological and clinical features of nodular fasciitis, explores the pitfalls of investigation modalities and describes its management.

BACKGROUND

Nodular fasciitis (NF) was first described in 1955 by Konwaler *et al*¹ under the pseudonym 'subcutaneous pseudo sarcomatous fibromatosis'. The WHO describes it as a benign and reactive fibroblastic growth extending from the superficial fascia into subcutaneous tissue or muscle.²

Though rare, it is an important condition to understand for various reasons. First, NF can affect almost any site of the body except the viscera.³ Upper extremities, particularly the forearms, represent the most common site (45%)⁴ with the head and neck region being the second most prevalent (7–20%).⁵ This means doctors of varying specialties

will encounter the problem, yet knowledge of this condition among medical professionals is limited.

The most important learning point is that NF shares clinical features and investigation findings with other conditions. NF typically arises as a rapidly growing, painless, firm, well-circumscribed lesion.⁶ Histology shows rich cellularity, high mitotic activity and lack of a capsule.^{6–7} These characteristics lead to NF frequently being confused with other benign conditions and also, more worryingly, aggressive malignancies such as sarcomas. Establishing an accurate diagnosis can therefore prove difficult to achieve but is important given the potential of initiating hazardous and incorrect management plans. We present an unusual case of NF of the masseter.

CASE PRESENTATION

A 73-year-old man presented to ENT clinic with a 3-month history of a rapidly growing, right-sided cheek lump. He reported no pain, gustatory swelling, periodontal symptoms or history of trauma. He had no significant medical or smoking history and did not drink alcohol.

On examination, he had a right-sided lump seemingly affecting his accessory parotid gland around his parotid duct. This was smooth, firm and felt benign. There were no overlying skin changes. Bimanual palpation was normal. Facial nerve was intact. Oral and endoscopic examination of his larynx and pharynx was entirely normal. An ultrasound scan was arranged (figure 1).

Fine needle aspiration was performed under local anaesthetic. The results wrongly suggested necrotising malignancy with squamous differentiation. A metastatic squamous cell carcinoma or

Figure 1 Ultrasound scan shows a 1 cm, well-defined, hypoechoic lesion which appears to be arising from the inferior aspect of an accessory right parotid gland. Subtle vascular flow was noted within the lesion. Appearances were in keeping with pleomorphic adenoma.

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Figure 2 MRI which is reported to show a 15 mm, well-defined enhancing focus on the superficial aspect of the right masseter which the lesion may be invading (A). The lesion was closely related to the accessory parotid tissue and it was reported as difficult to ascertain whether it arose from the gland (B). There was no abnormality noted in the upper aerodigestive tract.

primary salivary malignancies with squamous differentiation were considered in the differential diagnosis. One month later, he was seen in clinic with the above results. Examination revealed no oral cavity, nasal vestibule, external auditory canal, scalp or face primary malignancy. MRI (figures 2A and 2B) and positron emission tomography scan (figure 3) were organised.

TREATMENT

Six weeks after presentation, he was reviewed in clinic with the above results. He underwent complete surgical excision of the lesion 5 days later. Histology is shown below (figures 4–6).

OUTCOME AND FOLLOW-UP

He was reviewed in clinic 2 weeks after surgery where he was informed histology and immunohistochemical analysis revealed

NF with no evidence of any malignancy. The tumour was noted to be completely excised and on examination there was no residual with a well-healed wound. He was subsequently discharged.

Two months after discharge, the patient represented with concern of a recurrent lump in the scar. Examination revealed hypertrophic scarring with no evidence of recurrence at the site. He was once again discharged from clinic.

DISCUSSION

NF is a benign, proliferative neoplasm that can affect any body area and never metastasises. There is no gender predilection, but it is most common between the third and fifth decades of life.⁸ Indeed only 10–20% of cases are found in individuals >50.⁸

The orofacial region represents the second most common area affected with facial skin, parotid sheath and subcutaneous tissues over the mandible and zygoma particularly susceptible.⁹ Intraoral NF is rare but may affect the tongue, floor of mouth, alveolar and buccal mucosa.⁸ Disease arising within the masseter is certainly extremely unusual.

A large dermatological analysis by Mehregan divides classic NF into three subtypes: subcutaneous, intramuscular and fascial.¹⁰ However, there are also other uncommon variants including intravascular, cranial, intradermal, ossifying and proliferative fasciitis.¹⁰ The pathogenesis of NF is unclear. It is a self-limiting lesion which is either reactive or inflammatory in nature.⁹ It has been postulated that trauma may be a preceding factor. In the literature, 10–15% of cases have been associated with trauma.¹⁰ However, other evidence suggests trauma is rarely reported as a causative factor.

NF represents a diagnostic conundrum. Clinical examination is wholly inadequate on diagnosing the lump with its worrying characteristics of being firm, rapidly growing and well circumscribed. Radiological imaging is of little help. Toledo *et al*¹¹ report that NF on CT scanning shows a well-defined, homogenous mass and contrast-enhanced CT shows mild or no enhancement. Other literature reports that NF shows non-specific findings with no unique radiological characteristics on CT or MRI making specific diagnosis of NF very difficult and often impossible with imaging.^{12 13}

Even histopathological results are confusing. NF lesions are typically well delimited, non-encapsulated lesions composed of haphazardly arranged pleomorphic spindle cells in a myxoid stroma.¹⁴ These cells have plump, oval nuclei and can be mitotically active, but cellular atypia is not seen.¹⁵ However, the presence of spindle-shaped cells, mitotic activity, rich cellularity and the potential for the lesion to spread along peritoneal spaces often leads to misdiagnoses of sarcoma or other mesenchymal neoplasms.⁹ With the above strategies being utilised, the list of differential diagnoses is large. Benign fibrous histiocytoma, neurofibroma and fibromatosis can have a similar appearance. More worryingly, malignant conditions including dermatofibrosarcoma, fibrosarcoma and leiomyosarcoma have similar characteristics also.^{8 16}

Immunohistochemical analysis represents the key to diagnosis. NF cells express vimentin (a fibroblast marker), muscle-specific actin and smooth muscle actin positivity.^{8 14} They do not contain desmin, keratin or S-100 protein.^{16–18}

The gold standard treatment for NF is surgical excision. The lesion is locally invasive but recurrence is rare if complete excision is performed.⁴ If recurrence does occur then incomplete resection or a malignant process should be suspected.^{19 20} However, the literature does report spontaneous regression of NF after biopsy and incomplete excision.^{5 21} As distinguishing

Figure 3 Positron emission tomography scan image. The lesion shown was reported as a metabolically active lymph node. No metabolically active primary head and neck tumour was observed during the scan.

Figure 4 Histology (×200 magnification): spindle cell lesion with a loose storiform/tissue culture appearance, red cell extravasation and lymphocytes.

Figure 5 Histology (×40 magnification): spindle cell lesion which is circumscribed but not encapsulated and centred within skeletal muscle.

Figure 6 Lesion is seen to express smooth muscle actin but is negative for S100, calponin, desmin, β -catenin, epithelial membrane antigen and CD34.

biopsy results of NF from a malignant tumour is difficult, complete excision is advocated at all times.

As described above, orofacial NF is common and has been extensively documented. However, only one case of NF of the masseter has previously been published in the literature. A case series by Han *et al*¹⁶ observed six cases of NF in China. One report was of a 50-year-old man who presented with a 1-month history of a gradually enlarging swelling in the left masseter. Just like in our case, there was no history of trauma and examination revealed a firm mass.

In contrast to our patient, a trial of antibiotics was initially started as a treatment measure but this proved ineffective. However, the lump was later surgically excised. Histopathological analysis showed similarities to that of our case. Both showed a well-delineated lesion with cells in a myxoid stroma and the

presence of extravasated erythrocytes.¹⁶ Interestingly, unlike ours, their patient's lesion was surrounded by a fibrous pseudocapsule. Han *et al* do not mention whether immunohistochemical analysis was performed and any potential results of this. Their patient had no recurrence as of 8 years follow-up and our patient was clear of disease 1 year after surgery when this report was written.

Contributors SB was responsible for writing the article. RN, RS and JW were involved in provision of images and article review.

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REFERENCES

- 1 Konwaler BE, Keasbey L, Kaplan L. Subcutaneous pseudosarcomatous fibromatosis (fasciitis). *Am J Clin Pathol* 1955;25:241–52.
- 2 Evans H, Bridge JA. Nodular fasciitis. World Health Organization classification of tumours. In: Fletcher C., Unni K. & Mertens F. eds. *Pathology and genetics of tumours of soft tissue and bone*. Lyon: IARC Press, 2002:48–9.
- 3 Bernstein KE, Lattes R. Nodular (pseudosarcomatous) fasciitis, a non-recurrent lesion. Clinicopathological study of 134 cases. *Cancer* 1982;49:1668–78.
- 4 Hino S, Masuda I, Fukai S, *et al*. A case of nodular fasciitis involving the tongue. *J Oral Maxillofac Surg* 2014. In press.
- 5 Dayan D, Nasrallah V, Vered M. Clinico-pathologic correlations of myofibroblastic tumors of the oral cavity: 1. Nodular fasciitis. *J Oral Pathol Med* 2005;34:426–35.
- 6 Nair P, Barrett AW, Theodossy T. Oral nodular fasciitis: case report. *Br J Oral Maxillofac Surg* 2004;42:360–2.
- 7 Vyas T, Bullock MJ, Hart RD, *et al*. Nodular fasciitis of the zygoma: a case report. *Can J Plast Surg* 2008;16:241–3.
- 8 Martínez-Blanco M, Bagán JV, Alba JR, *et al*. Maxillofacial nodular fasciitis: a report of 3 cases. *J Oral Maxillofac Surg* 2002;60:1211–14.
- 9 Leventis M, Vardas E, Gkouzioti A, *et al*. Oral nodular fasciitis: report of a case of the buccal mucosa. *J Craniomaxillofac Surg* 2011;39:340–2.
- 10 Kamiya H, Araki M, Kitajima Y. Nodular fasciitis of the cheek. *Eur J Dermatol* 2003;13:189–91.
- 11 Toledo AS, Rodríguez J, Cuasay NS, *et al*. Nodular fasciitis of the facial region: CT characteristics. *J Comput Assist Tomogr* 1988;12:898–9.
- 12 Sharma AK, Scott G, Westesson PL. MRI sign of nodular fasciitis: a case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;105:e53–6.
- 13 Shin JH, Lee HK, Cho KJ, *et al*. Nodular fasciitis of the head and neck: radiographic findings. *Clin Imaging* 2003;27:31–7.
- 14 Chaitanyaa N, Somannavar P, Annajal NA. Nodular fasciitis over the anterior wall of the maxillary sinus: a case report and review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2013;115:e10–15.
- 15 Graadt van Roggen JF, Hogendoorn PC, Flecher CD. Myxoid tumours of soft tissue. *Histopathology* 1999;35:291–312.
- 16 Han W, Hu Q, Yang X, *et al*. Nodular fasciitis in the orofacial region. *Int J Oral Maxillofac Surg* 2006;35:924–7.
- 17 Eversole LR, Christensen R, Ficarra G, *et al*. Nodular fasciitis and solitary fibrous tumor of the oral region: tumors of fibroblast heterogeneity. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999;87:471–6.
- 18 Haddad AJ, Avon SL, Clokie CM, *et al*. Nodular fasciitis in the oral cavity. *J Can Dent Assoc* 2001;67:664–7.
- 19 Huang CD, Lin YH, Lee FP. Postauricular nodular fasciitis. *Otolaryngol Head Neck Surg* 2007;137:164–5.
- 20 Nishi SP, Brey NV, Sanchez RL. Dermal nodular fasciitis: three case reports of the head and neck and literature review. *J Cutan Pathol* 2006;33:378–82.
- 21 de Carli ML, Sá Fernandes K, dos Santos Pinto D Jr, *et al*. Nodular fasciitis of the oral cavity with partial spontaneous regression (nodular fasciitis). *Head Neck Pathol* 2013;7:69–72.

Learning points

- Nodular fasciitis is a rare, benign, rapidly proliferative neoplasm of unknown aetiology which can affect any area of the body.
- It presents a diagnostic challenge due to its non-specific clinical, radiological and histopathological features as evidenced by our case.
- Owing to its similarities to malignancies, immunohistochemical analysis is essential for accurate identification.
- Management is by complete surgical excision which should prove definitive.

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