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Parotid nodular fasciitis in a mobile phone user

Clifford Pereira, Michael Edwards

Abstract
We describe the first case of nodular fasciitis affecting the deep lobe of the parotid gland in a 39-year-old male telephone engineer and its possible association with the high usage of mobile phones.

Key words: Fasciitis; Parotid Gland; Telecommunications

Introduction

The dangers of the radio-frequency (RF) fields emitted by mobile phones, that penetrate skin, skull and brain,[1] are not known. We describe the clinical presentation, diagnosis and intra-operative and pathological findings of the 21st case of parotid nodular fasciitis to be reported in the world literature, associated in this case with the high usage of mobile phones.

Nodular fasciitis is a benign pseudosarcomatous proliferative lesion of myofibroblasts that usually arises in subcutaneous tissue. The lesion may easily be misinterpreted as a sarcoma, on clinical grounds, owing to its often rapid growth without signs of concurrent infection, and on microscopy owing to high cellularity and mitotic activity and a frequently indistinct delineation.[2]

History

A 39-year-old telephone engineer presented with a five-month history of a gradually increasing swelling of his right parotid area, not associated with pain, fever, facial weakness or other ENT symptoms. There was no history of recent trauma. He had not other medical problems, was not on any regular medication, and had no known allergies.

He had used a mobile phone for at least one hour per day on an average for the past four years (an analogue model for the initial three years and a digital model for the past year). He had also used radio transmitters as a police officer between the years 1977–79 and 1981–88.

On examination he had a diffuse 3 cm swelling of the right parotid gland. There were no overlying skin changes. The left parotid gland was normal. Per oral examination revealed normal parotid duct openings and normal tonsils. There was no cervical lymphadenopathy and cranial nerve examination was normal. A decision to operate was taken as the condition was clinically diagnosed as a pleomorphic adenoma of the parotid gland. Intra-operatively, he had a poorly defined 2.5 cm swelling that was arising from the deep lobe of the parotid gland. A total right parotidectomy was performed. There were no complications from the procedure and no recurrence was noted after eight months.

Pathology

Microscopic examination revealed a well demarcated nodule of interlacing plump fibroblasts set in a stroma which was focally myxoid. There were areas of feathery degeneration with some red cells and chronic inflammatory cells. Mitotic activity was very low. The histological appearances indicated a nodular fasciitis, that presumably had arisen from the extra-capsular connective tissue or the connective tissue, of the deep lobe of the parotid, without invasion of the gland proper. A parotid lymph node in the specimen, showed mild reactive features. (See Figures 1 and 2, standard haematoxylin and eosin stains were used.)

Discussion

Nodular fasciitis very rarely affects the parotid gland, this being only the 21st case that we could trace in the world literature. This is also the first case to be recorded in relation to the deep lobe of the gland.[2–16] Although nodular fasciitis is associated with a history of physical trauma in 40 per cent of cases,[2] there was no such positive history in our case. However, with an average use of his mobile phone of at least an hour an day, we estimate the

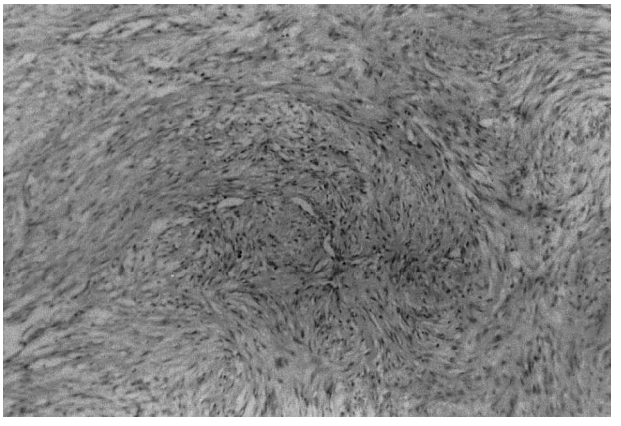

Fig. 1

Low-power view of parotid tissue showing interlacing bundles of plump spindle-shaped cells. A storiform or cartwheel arrangement is noted in some areas (H&E; ×100).

From the Department of General Surgery, Friarage Hospital, Northallerton, North Yorkshire, UK.
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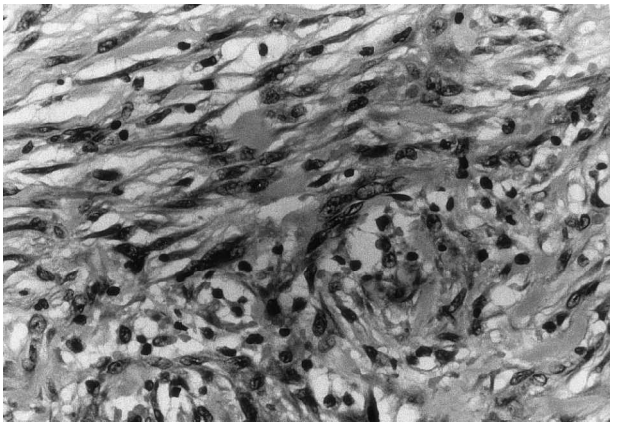

FIG. 2

High-power view of tumour showing plump reactive fibroblasts arranged in interlacing bundles (H&E; ×400).

patient's exposure to radio-frequency radiation and hence to electromagnetic trauma to have been about 20 times more than that of the average mobile phone user. Being left-handed, he usually held the phone to his right ear to enable him to write with his left hand. Absorbed radio-frequency energy is converted to heat in tissues, the amount of thermal energy absorbed per mass unit (watts/kilogram) being expressed by a quantity called the specific absorption rate (SAR). The SAR associated with mobile phones usage has been measured to be maximum in or close to the ear tissue (0.6–4.2 Watts/kg).[17]

Several studies have reported findings consistent with in vitro effects of low level radio-frequency radiation such as thermal damage to collagen ultrastructure, increase in cell proliferation, increase in DNA and RNA transcription rates, and increase in protein kinase enzymatic activities that in turn are associated with the increased activity of mitogens.[17–21] These effects were seen within 24 hours of tissue exposure. The average SAR values ranged from 1.5 to 75Watts/kg, and the frequencies used in the studies were between 900–2450 MHz. The frequency range and the SAR associated with mobile phones are well within the range used in the above studies. Hence the possible association of nodular fasciitis with the excessive use of mobile phones.

Conclusion

The methods and exposure parameters used in the studies involving radio-frequency radiation vary widely. No independent replications of the positive findings have yet been reported. None the less, with the ever-increasing use of the mobile telephone, physicians as well as mobile telephone users should be aware of, and be on the look out for, possible effects of radio-frequency radiation. A history of use of mobile phones should also become part of routine history taking for head and neck lesions.

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Address for correspondence:
Michael Edwards,
Department of General Surgery,
Friarage Hospital,
Northallerton,
North Yorkshire DL6 1JG, UK.

Fax: + 44 (0)1609 764631
E-Mail: MichaelHEdwards@compuserve.com

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