GIANT-CELL EPULIS

ANALYSIS OF 26 CASES

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Introduction

THE ætiology of giant-cell epulis has been the subject of much discussion; it is still obscure whether it is a neoplasm or a lesion in which trauma is an inciting factor, and its relation to giant-cell tumours of the long bones is another controversial point. It is possible that several types of giant-cell epulis differing in origin exist.

In order, if possible, to contribute to the elucidation of these problems, all cases of giant-cell epulis treated in the Radium Centre for Jutland and Aarhus Kommunehospital since 1935 have been reviewed and the results of treatment analysed. The results of this analysis show that *in most of these cases the epulides must be considered to be neoplasms, and that traumatic injury cannot be demonstrated to have played a part as an inciting factor, but may have accelerated the growth of the tumours.*

Historical Review

The term *epulis* is of Greek origin, meaning "upon the gum", and thus actually designates any outgrowth from the gingiva, whether fibrous, angiomatous, inflammatory or a giant-cell tumour. However, a distinction is usually made between two forms of epulis, viz. *fibrous* and *giant-cell epulis* (Boyd). In Denmark, *the designation epulis is used in the histological diagnosis only when the tumour contains giant cells*, and it is this form which is considered below. It is usually regarded as a variant of the giant-cell tumours occurring in the long bones. The ætiology of these tumours is not fully clarified either.

The designation giant-cell tumour was introduced by Bloodgood in 1910. He maintained that this tumour was benign, and the idea of benignity gradually gained ground and superseded the view which had

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been held in the nineteenth century, viz., that it was malignant, or that it might at least "degenerate" into malignancy. Before Bloodgood's introduction of the new term, the growth was usually described as a myeloid tumour or myeloid sarcoma. Thus, while it is now generally agreed that the tumour is benign, considerable difference of opinion as to its ætiology still exists, some investigators postulating that it is referable to traumatic injury, others that it is a genuine tumour.

Geschickter and Copeland (1930) strongly emphasized that trauma was an important factor in the development of giant-cell tumours. In support of this view they gave the following reasons:

Trauma may block the periosteal arteries, for example, by the occurrence of a hæmatoma. The osteoclasts are activated to provide new canals. The impaired blood supply results in necrosis of the bone tissue from which the osteoblasts are supposed to form new bone. The normal equilibrium between bone formation and bone destruction does accordingly not occur. In the early stages of osteitis fibrosa, giant cells are always present in large numbers; that is to say that, in the view of Geschickter and Copeland, solitary bone cysts may in many cases be regarded as healed giant-cell tumours. The healing occurs in the metaphysis, in which the cortex and periosteum are thick, but not in the epiphysis where the cortex and periosteum are thin; accordingly, giant-cell tumours involve the epiphysis and cysts the metaphysis. Giant-cell tumours occur only in bones preformed in cartilage, but the maxilla and mandible form exceptions from this rule. That giant-cell tumours do occur in these bones is explained by Geschickter and Copeland as follows:

The shedding of the deciduous teeth is brought about by proliferation of giant cells arising from the periosteum and resorbing the roots of these teeth. Epulis occurs in relation to this resorption of the deciduous teeth; according to Geschickter and Copeland, this explains why epulis is most frequent in children and adolescents, never develops before secondary dentition, and never involves the posterior molars.

In contrast to these authors, Jaffe, Lichtenstein and Portis (1940) claim that a genuine giant-cell tumour exists which must be regarded as a neoplasm. Based on its histological structure, mainly on differences in stromal cell detail, they classified this tumour into three grades.

Grade I has spindle-shaped stromal cells and few or no mitoses.

Grade II constitutes a somewhat varied group, ranging from tumours in which the stromal cells show only slight atypism to those in which they are strikingly atypical.

Grade III has a large number of closely compacted anaplastic stromal cells presenting an irregular whorled arrangement, and according to the authors, tumours of grade III tend to recur and metastasize. Sharp, Bullock and Hazlet (1956) report that others have found little correlation between the clinical behaviour and the microscopic appearance.

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In addition, some other giant-cell tumour variants exist, for example, epulis, on which Jaffe *et al.* comment as follows:

"The problem of explaining the evolution of giant-cell epulides is a rather difficult one, involving, as already suggested, the old bedevilling controversy of neoplasia versus posthæmorrhagic reparative granuloma. The difficulty may be resolved in part if one regards the epulides as probably constituting a mixed group of lesions with a varied genesis, which is reflected in their microscopic appearance."

On the relation between the epulides and the giant-cell tumour Jaffe *et al.* write:

"The epulides have in common a rather vascular connective tissue and an appreciable number of multinuclear giant cells.

There are also certain epulides with a more richly cellular stroma composed of ovoid and spindle-shaped cells, and there are numerous giant cells whose nuclei resemble those of the stroma and may even present an appreciable number of mitoses. Such an epulis may develop as an outgrowth of a central giant-cell tumour of the jaw, but may also arise as an independent growth representing the periosteal counterpart of the giant-cell tumour of bone."

Bernier and Cahn (1954) reported 43 cases of epulis. The histological picture was found to differ from that of genuine giant-cell tumour; there were fewer giant cells, which were not scattered diffusely but were arranged in irregular clusters. The stroma was characterized by fibrocytes arranged in fibrous areas, and the entire lesion was surrounded by a zone of connective tissue. The presence of blood pigment was interpreted as indicating a previous hæmorrhage, which was taken as evidence in support of the assumption that trauma plays a part in the pathogenesis. The authors therefore used the designation "peripheral reparative giant-cell granuloma" instead of tumour. In more than one half of the cases a history of trauma was revealed, most frequently in the form of dental extraction.

Sharp *et al.* (1956) classified the giant-cell lesions of the jaws as follows:

1. Central giant-cell tumour.
2. Central giant-cell reparative granuloma.
3. Peripheral giant-cell reparative granuloma.

The distinction between tumour and granuloma is based on the differences in the microscopic appearance as described by Jaffe *et al.*

The distinction between central and peripheral lesions is based both on the clinical and radiographic appearance.

The peripheral lesion is assumed to arise from the periosteum, from which it grows towards the gingiva, so that it becomes visible before radiographic bone changes develop, whereas the central form arises in the osseous tissue, growing expansively and producing a rounded radiolucent

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zone in the jaw (soap-bubble appearance)—usually unilocular, only in rare instances with the lamina dura preserved everywhere. However, radiographic changes which are specific for central giant-cell tumours of the jaws do not exist (Sonesson, 1950; Lichtenstein, 1952; Waldron, 1953).

Personal Investigations

In the Radium Centre and the Department of Otolaryngology of Aarhus Kommunehospital a total of 150 cases of tumour of the gingiva were treated within the years 1935-1957. Among these, histological examination revealed *giant cells in 26 cases, which are therefore here referred to as giant-cell epulis*. The patients were 15 females and 11 males, whose ages ranged from 7 to 78 years, the average ages for females and males being 38 and 34 years, respectively; 14 of the patients were over 30 and only four under 20 years of age, which speaks against the assumption of Geschickter and Copeland that secondary dentition should be of importance in the development of epulis.

Localization

Of the epulides, 17 involved the upper jaw, including 12 on the right side, and 9 the lower jaw. This distribution is not in agreement with other reports, in which it is usually stated that the upper and lower jaws are equally affected.

In not less than five cases did the epulis involve the molar region, which is also in disagreement with the theories of Geschickter and Copeland.

Trauma

In 19 of the patients a history of previous trauma* could not be elicited. In five cases, the epulis developed at a site where a tooth had been extracted shortly (1-12 months) before the lesion was noticed, and the patients attributed the development of the tumour to the extraction. In two patients, a trauma was followed by increased growth of the tumour. About one half of the patients wore dentures.

Symptoms

Epulis was usually completely asymptomatic. In most cases, the tumour was discovered quite accidentally, and its growth had occurred without producing any symptoms. Only one patient complained of tenderness, and two had experienced oral bleeding. In several cases, it was the dentist who had first noticed the tumour.

* As distinct from Bernier and Cahn, who revealed traumata in 53 per cent. of their cases, we did not include peridental treatment, irritation from prostheses, injudicious use of toothpicks, etc., under the concept of trauma.

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Pathology

At the physical examinatio , the tumour presented a highly variable appearance. Its diameter varied from 0·5 to about 5 cm. The colour was usually bluish red. The tumour was described as an elastic, irregular mass

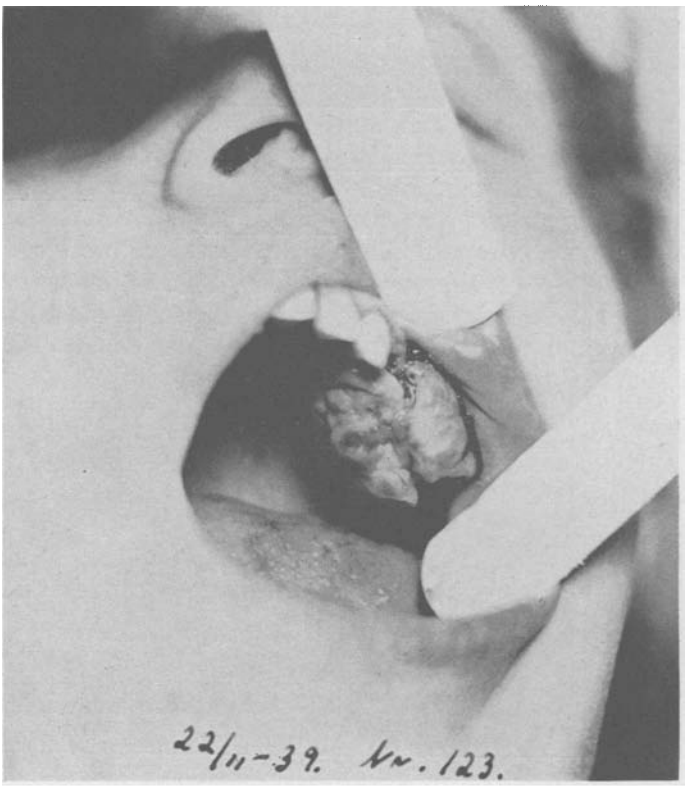


FIG. 1.
Large giant-cell epulis of the left upper jaw.

of a fleshy consistency, and usually broad-based (Fig. 1). In two cases, expulsion or loosening of teeth had occurred in the tumour region. Occasionally, ulceration of the tumour surface was present.

Radiographic Appearance

Radiographic studies were performed in 16 of the 26 patients. No abnormalities were revealed in eight, while the remaining eight showed a radiolucent zone of varying size in the alveolar process of the involved area. This was also observed in several patients with very small and apparently quite superficial tumours. Thus, none of the cases revealed the

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aforementioned changes which (according to Sonesson) are characteristic, although not pathognomonic of central giant-cell tumours.

It must be assumed that it is not always possible to distinguish between peripheral and central tumours.

Histology

The histological examination with a view to a possible differentiation

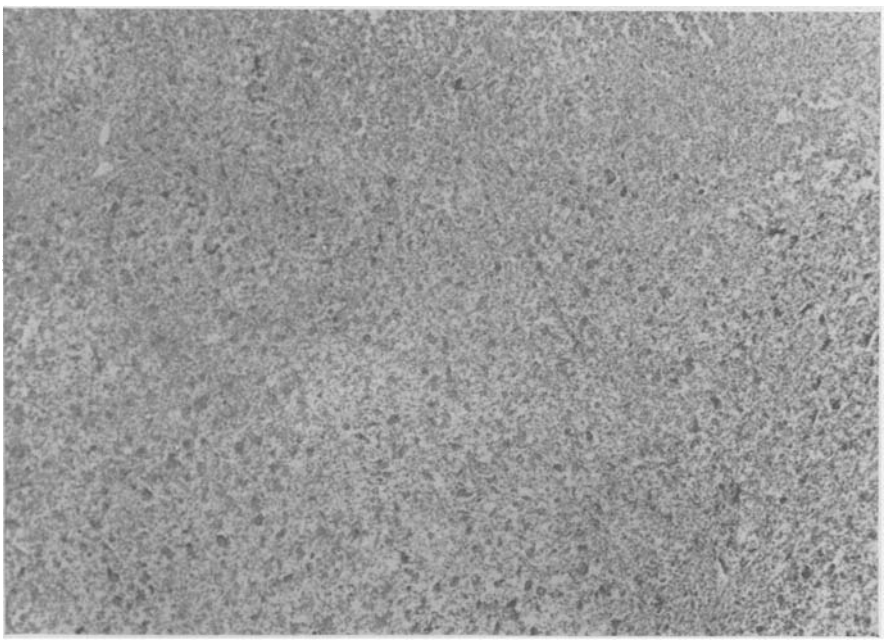


FIG. 2.
Section from giant-cell epulis. The giant cells are scattered diffusely in a uniform stroma. ×48.

into several groups of pathohistological pictures was performed by Dr. Tage Lund, of the Institute of Pathological Anatomy, Aarhus Kommune-hospital.

This examination revealed a highly uniform picture in all the tumours except three, which differed from the main group.

The typical histological picture showed a stroma composed of mono-nuclear spindle-shaped or ovoid cells with rounded or oval nuclei. The cells were closely compacted with a sparse intercellular substance. No fibrous areas were seen. Numerous multinuclear giant cells were scattered diffusely in the stroma. The nuclei of the giant cells were most frequently collected towards the middle of the cells; they were rounded or oval, resembling those of the stroma (Figs. 2 and 3).

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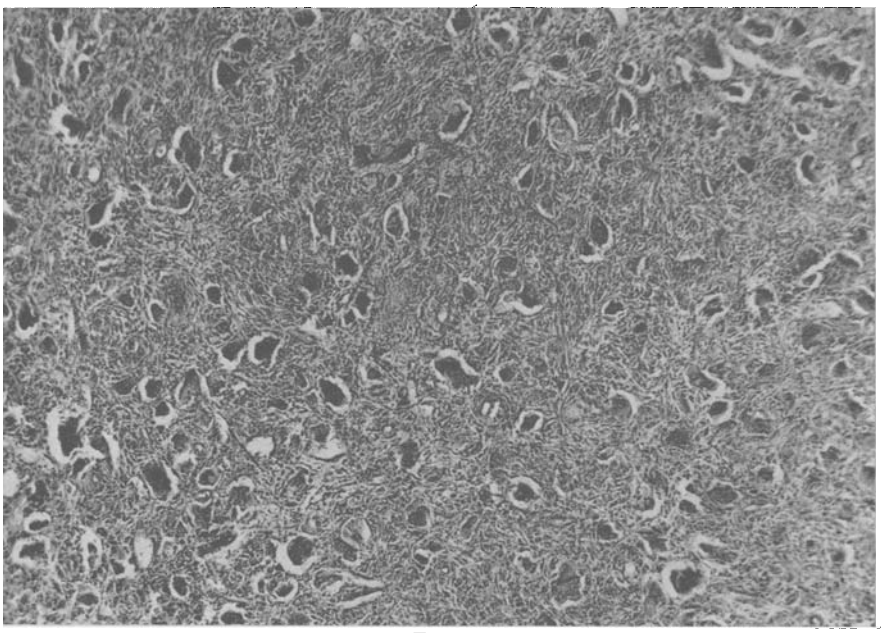


FIG. 3.
Section from giant-cell epulis. The stromal cells are closely compacted; only sparse amounts of intercellular substance are present. × 192.

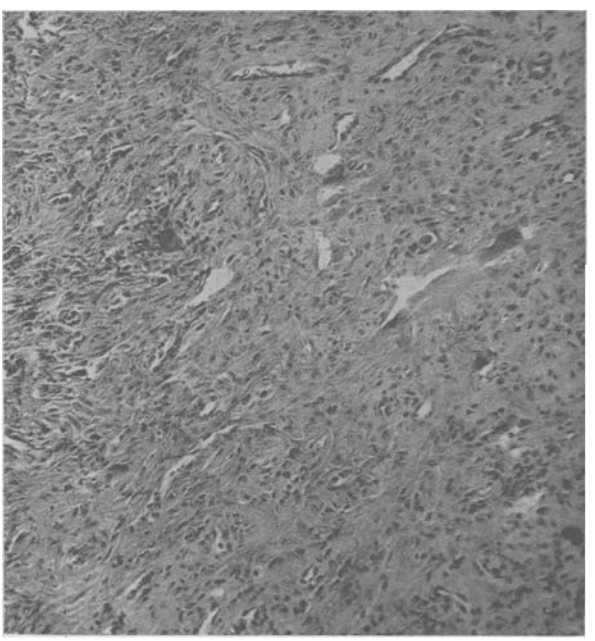


FIG. 4.
Section from a fibrous epulis, showing few scattered giant cells. × 192.

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The tumour tissue showed abundant vascularization, and hæmorrhage was frequently seen. A few tumours revealed bone tissue.

Two tumours showed numerous fibrous areas in the stroma. The giant cells were here collected in irregular clusters, thus displaying the same histological picture as described by Bernier and Cahn. One tumour was composed almost exclusively of fibrous tissue; only towards the periosteum a few giant cells were seen (Fig. 4).

Thus, in contrast to Bernier and Cahn, we found in all cases except three the typical picture of a genuine giant-cell tumour just as is seen in the long bones and similar to grade I described by Jaffe *et al.*

Treatment

Small epulides without bone involvement may be removed locally. In the presence of bone involvement, the removal must be combined with dental extraction and curettage or electrocoagulation. Large central tumours require excision of the bone tissue with complete exposure of the area involved. Thoma and others claim that surgical treatment is adequate, and that recurrence may be due to inadequate removal.

Jaffe *et al.* maintained that in the treatment of giant-cell tumours there seems to be some evidence that in certain cases irradiation as an adjuvant to curettage may even stimulate recurrence or increase the aggressiveness of the lesion.

In the present series, seven patients were given surgical treatment alone consisting in extirpation of the growth. In the remaining patients, surgical treatment was combined with postoperative irradiation by radium needles inserted into the cavity. Three patients were treated with radium irradiation only, and one was given pre-operative roentgen irradiation.

The lesion did not recur in any of the seven patients who had received surgical treatment alone. Recurrence was experienced in one patient of the group given surgical treatment plus irradiation and in one of the three patients who were treated with radium irradiation alone. In both cases, the recurrence disappeared after renewed treatment, and all the patients have since been free from recurrence, in most cases for more than 3 years. The recurrent lesions showed the same histological picture as the main group of the original tumours.

The surgical measures applied were simple extirpation, sometimes followed by curettage of the tumour-bearing area or electrocoagulation. In two patients, extraction of teeth were necessary. The result of this purely surgical treatment seems to be fully satisfactory. One of the cases treated with radium gave rise to osseous necrosis with sequestration. It may be said that supplementary radium irradiation does not improve the result.

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Case Report

It may be of interest to give a brief description of one of the case histories because it illustrates the part played by trauma in the development of epulis.

The patient was a 9-year-old boy, who had previously been in good health, without any symptoms from the mouth or teeth. One day, he fell, hitting the right side of the mouth against an iron bar. Some bleeding occurred, and the right canine tooth of the upper jaw loosened. Two days later swelling of the right cheek

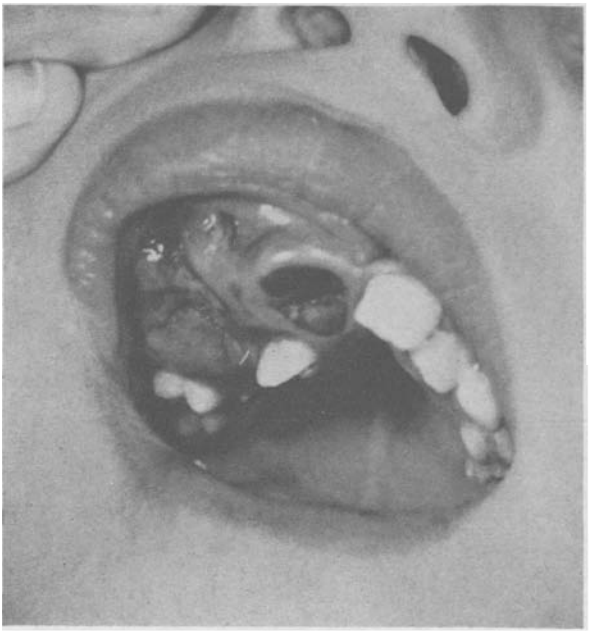


FIG. 5.
Boy, aged 9 years, with a large giant-cell epulis of the right upper jaw.

developed; it continued to increase in size, for which reason the patient was admitted to hospital three weeks later. Clinical examination revealed a bluish red tumour of a fleshy consistency, about 4 cm. in diameter, in the right upper jaw, strongly suggestive of malignancy (Fig. 5). Radiographic examination revealed a large, expansive, space-occupying lesion of the right superior alveolar process with displacement of the developing dental tissue and elimination of the normal osseous border in the right side of the gingiva (Fig. 6). The levels of serum calcium and serum phosphorus were normal.

A biopsy specimen showed typical genuine giant-cell tumour with numerous scattered giant cells embedded in a uniform stroma without fibrous areas, but with distinct traces of hæmorrhage. In view of the close relationship in time between the trauma and the unusually rapid growth of the tumour, it was

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tempting to assume that the trauma was the causative factor. However, a renewed examination of some radiographs taken three days after the trauma showed a small cyst-like radiolucent area around the lateral incisor on the right side. As such a cyst could not possibly have developed within the space of three days, this observation shows that the tumour must have been present before the

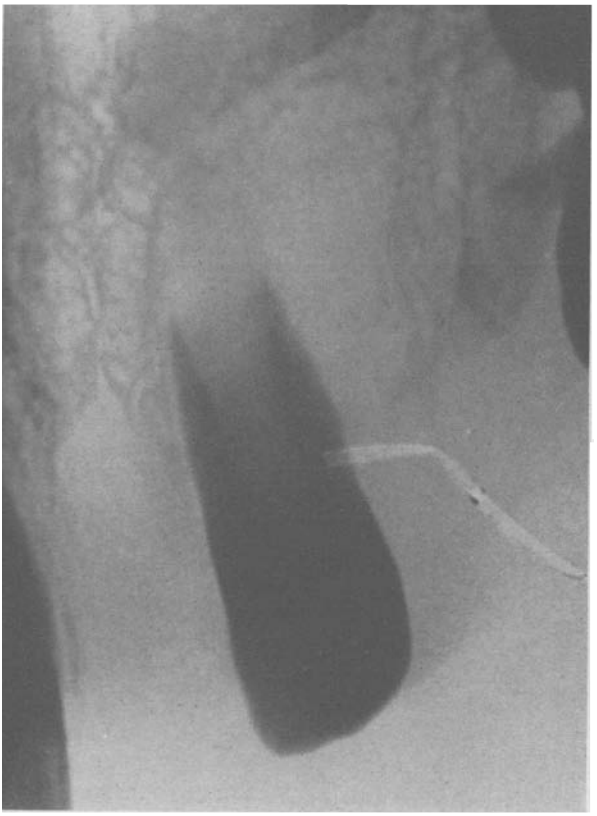


FIG. 6.
Radiograph of the upper right alveolar process, showing an area of osseous destruction around the lateral incisor.

trauma was sustained, but its growth has probably been accelerated by the trauma. The lesion was a giant-cell tumour, presumably of central origin.

Discussion

Clinically, the appearance of giant-cell epulis shows very wide variations. It is difficult, with certainty, to distinguish between central and peripheral epulides, since there are no radiographic changes which can be

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said to be specific for central giant-cell tumours, and since even small superficial epulides may give rise to radiolucent areas in the bone.

Epulis has *a favourable prognosis*. In the present series, only two recurrences were encountered after treatment. Surgical treatment gave good results, which were not further improved by postoperative supplementary radium irradiation.

The distribution and localization of the lesions in the present series do not reveal any evidence in support of the assumption advanced by Geschickter and Copeland that *the osteoclastic activity in the resorption of the deciduous teeth* should play a part in the development of epulides.

Only in a minority of patients can epulis be related to a *trauma*, and even in such instances the importance of traumatic injury must be regarded as problematic, since it has been shown in one case that the tumour was present before the trauma was sustained. *Thus, it is unlikely that epulis is generally due to traumatic injury*, but it will often be so that a trauma calls attention to the tumour and may accelerate its growth because of bleeding and disturbances in the blood supply.

In most cases of the present series, *epulis could not be distinguished histologically from other genuine giant-cell tumours*. Like the latter growths, epulides show a uniform picture with a fairly dense stroma composed of irregularly arranged, spindle-shaped or ovoid cells. Fibrous areas are absent. Giant cells are present in large numbers and are scattered diffusely in the stroma. It is therefore likely that most cases of epulis, like giant-cell tumours of the long bones, are genuine tumours.

The present series revealed only three cases with a different histological composition with many fibrocytes arranged in areas embedding giant cells in irregular clusters. This picture is more similar to that described as "peripheral reparative granuloma".

Thus, there are various forms of giant-cell epulis differing in histological composition and, probably, in genesis.

Considering the histological composition which cannot be distinguished from that seen in giant-cell tumours of the long bones and the fact that the series did not reveal any definite evidence in support of the ætiological importance of traumatic injury but, on the contrary, in one case showed that the tumour was present before a trauma called attention to it and gave rise to increased rapidity of growth, *most giant-cell epulides must be interpreted as genuine tumours*.

Summary

An analysis of 26 cases of giant-cell epulis is presented.

The importance of trauma in the development of epulis is discussed. In one case in which the tumour was diagnosed shortly after a severe trauma, it could be demonstrated that the tumour had been present before

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the trauma was sustained, for which reason it was assumed that the trauma had merely accelerated the growth of the tumour.

Radiographically, osseous changes can be demonstrated even in small epulides.

Histologically, most cases of epulis cannot be distinguished from genuine giant-cell tumours.

The analysis shows that several forms of giant-cell epulis exist, possibly differing in genesis. The majority of the cases in the present series must be interpreted as genuine giant-cell tumours.

Surgical treatment gives good results.

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