

Acute Suppurative Parotitis: *

A Study of 161 Cases

WILLIAM W. KRIPPAEHNE, M.D.,** THOMAS K. HUNT, M.D.,***
J. ENGLEBERT DUNPHY, M.D.†

From the Department of Surgery, University of Oregon Medical School and the Surgical Services of the University of Oregon Medical School Hospitals and Clinics

ACUTE suppurative parotitis in the aged or gravely ill patient is thought to carry such a grave prognosis that it is easy for the surgeon to take a fatalistic or nihilistic attitude toward its treatment. Local hygiene, irradiation, antibiotics, and sometimes incision and drainage are employed without precise indications or conviction about their value. The disease is rare; a few years ago it was thought to be disappearing,¹⁰ so that no single surgeon is likely to acquire a large experience with it. A recrudescence of the disease has been reported recently^{2,3} and with the increasing age of the population, it is likely that more surgeons are going to be faced with this problem.

This paper formulates indications for a deliberate approach to the surgical treatment of acute parotitis based upon an extensive experience with surgical drainage and a retrospective study of 161 cases collected from the records of the University of Oregon Medical School Hospitals and Clinics over the past 20 years. Comparative data were obtained from the Emanuel Hospital, in Portland.

* Submitted for publication October 24, 1961.

** Associate Professor of Surgery, University of Oregon Medical School.

*** Resident Surgeon, University of Oregon Medical School.

† Professor of Surgery and Chairman of the Department, University of Oregon Medical School.

This work was supported by a gift from the H. L. Berkman Foundation to the University of Oregon Medical School.

Incidence

The incidence of the disease is said to be increasing, and this is confirmed in an analysis of the cases in the Multnomah County Hospital which shows a marked increase in the last eight years as compared with the preceeding decade (Fig. 1). No increase in parotitis was observed, however, in a study of the records of the Emanuel or the University of Oregon Medical School Hospital, both of which serve a population typical of private community hospitals. Further analysis has disclosed the reasons for the increase in incidence in the Multnomah County Hospital. Parotitis is primarily a disease of the aged, and the vast majority of patients contracting it are over 60 years of age (Fig. 2).

During the period of this study the number of patients in the older groups entering the Multnomah County Hospital increased by a factor of four (Fig. 3). No such increase in aged patients was observed at the Emanuel Hospital or the Medical School Hospital (Fig. 4). Thus it would appear that the increase in the incidence of parotitis can be directly related to an increase in the number of aged patients in the Multnomah County Hospital.

Parotitis characteristically attacks the very ill patient. In this series, 131 of the 161 patients were suffering from severe or multiple diseases. In some instances, patients were moribund prior to the onset of parotitis. One quarter of the patients had

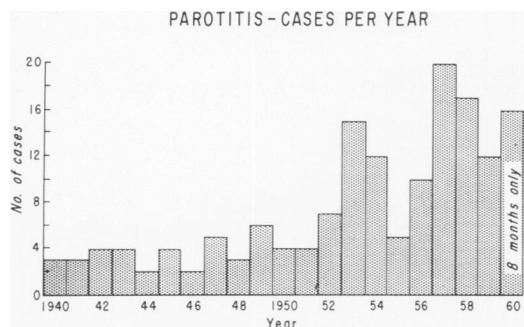


FIG. 1. Suppurative parotitis cases per year, Multnomah County and University of Oregon Medical School.

carcinoma and over one-half had pre-existing major infection elsewhere in the body. In only one-third did the disease develop in the postoperative period.

Pathogenesis

Pathogenesis has been debated for many years. Of the many theories, only transductal inoculation seems to be applicable to most cases. It has long been known that the majority of suppurative infections of the parotid are due to staphylococcus. Bucknall observed that patients with septicemia due to other organisms still developed staphylococcal parotitis.⁴ Petersdorf recorded several cases of staphylococcal wound infections antedating staphylococcal parotitis in which the organisms were dissimilar by phage typing.⁸ Crile ob-

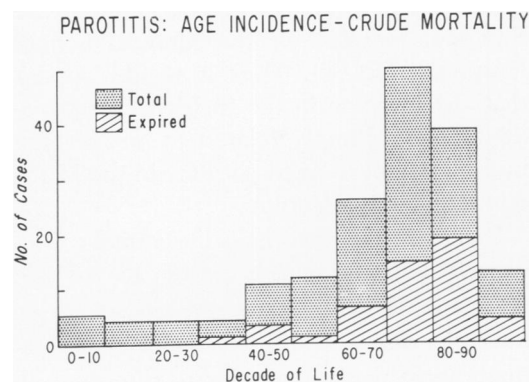


FIG. 2. Age incidence and crude mortality of parotitis by decades.

served that poor oral hygiene and lack of oral intake predisposed to invasion of the lower parotid duct by staphylococci.⁵

The inflammatory lesion of early parotitis is confined to an accumulation of cells within the larger ducts.⁶ The parenchyma and the smaller ducts are spared until the epithelium of the larger and medium sized ducts is destroyed and the inflammatory process invades the remainder of the gland (Fig. 5). Once penetration of the parenchyma has occurred, multiple abscesses form and later may coalesce. If the process continues, pus penetrates the capsule and invades the surrounding tissue. It does so usually along one of three routes: Downward into the deep fascial planes of the neck, backward into the external auditory canal, or outward into the skin of the face. Before the use of antibiotics, well defined abscesses developed in approximately one half of the cases.⁴

Predisposing Factors

A surgical operation is regarded as one of the most common predisposing factors but this was so in less than one-third of the cases in this series. Abdominal and orthopedic procedures, particularly for fractured hip, were the operations most frequently implicated. The interval between operation and the onset of parotitis varied from a few hours to many weeks. Twenty-one patients developed lesions within ten days of operation and 29 after ten days. In the former there were two deaths as opposed to 11 in the latter. The difference in mortality was related to poorer nutrition and deteriorating physical condition in patients who contracted the disease late in the postoperative period. Condition of the patient appears to be a more important predisposing factor than operation *per se*. The importance of host susceptibility is also demonstrated by the rarity of the disease in younger individuals unless they are severely ill.

Parotitis is not exclusively an *in hospital* problem, however, as one third of the pa-

MCH - AGE AT ADMISSION DATA

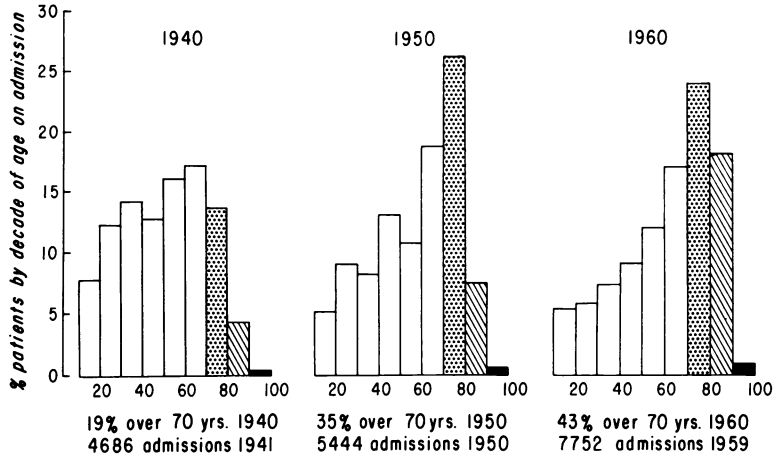


FIG. 3. Age incidence patterns of general admissions to the Multnomah County Hospital; 1940, 1950, and 1960. Obstetric and newborn admissions are excluded.

tients were admitted from their homes or nursing establishments with the disease well established (Table 1).

Dehydration, malnutrition, and oral cancer or infection are among the most common antecedents (Table 2). Indeed, these factors are probably more common than the records indicate. More than one-fourth of the patients were receiving antihistamines, phenothiazine derivatives, diuretics,

or anticholinergics, all of which tend to reduce or thicken oral secretions.⁹

Mortality

The data show that parotitis no longer deserves as ominous a reputation as it holds. Mortality from this disease in the Multnomah Hospital dropped sharply about 1945 with the introduction of antibiotics and has been falling steadily in recent

EMANUEL HOSPITAL ADMISSIONS-AGE FREQUENCY-1959

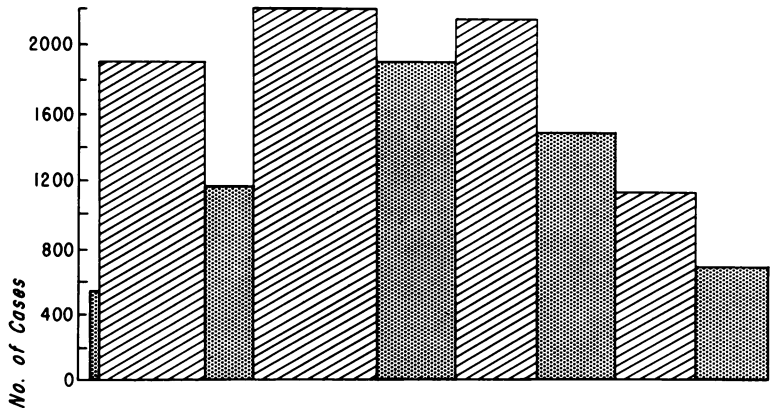
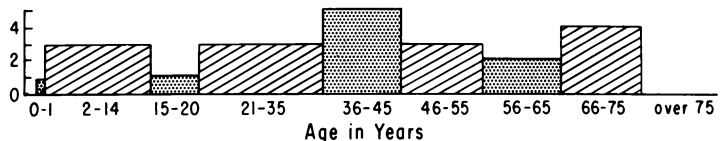


FIG. 4. Upper graph: Age incidence pattern of Emanuel Hospital admissions excluding obstetric and newborn admissions.

PAROTITIS-AGE FREQUENCY - 1948-1960



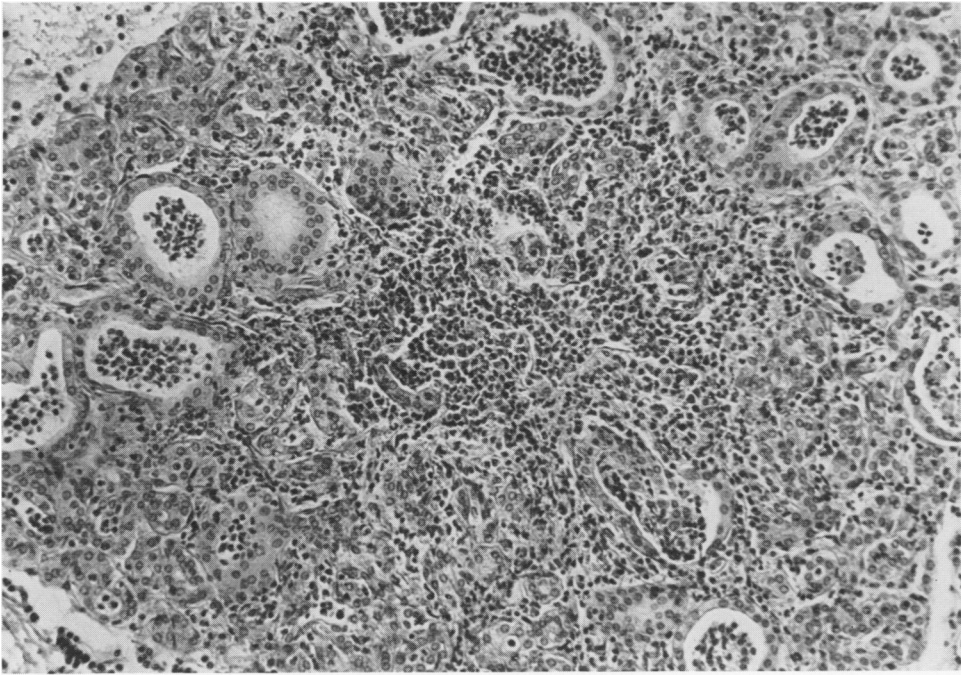


FIG. 5. Photomicrograph of parotid gland showing accumulation of cells within larger ducts, destruction of ductular epithelium and extension of the inflammatory process into the parenchyma.

years (Table 3). Prior to antibiotics, mortality rates from 30 per cent to as high as 87 per cent^{1, 7, 10} were reported. There is no question but that increasing age is directly related to an increase in mortality as shown

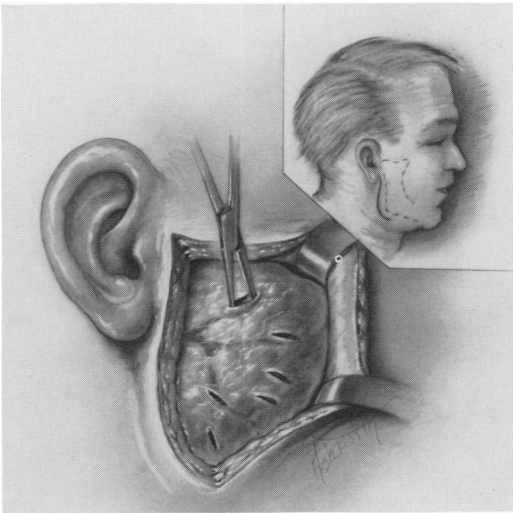


FIG. 6. Technic used for drainage of parotid abscesses.

in Figure 2. At the present time, however, nearly 80 per cent of all patients with parotitis can be salvaged by an aggressive plan of treatment despite the gravity of associated diseases and advanced age of the patients, Table 3.

In compiling the data for Table 3, only those deaths within three weeks of the onset of parotitis have been counted. Parotitis has either subsided or reached a chronic phase by this time and does not materially affect the ultimate outcome. Within the three-week period, all deaths have been attributed to parotitis so that the mortality data are crude figures. It is estimated, however, that without parotitis the mortality in this group of patients would have been 10 to 20 per cent due to the underlying disease alone.

Results of Therapy

1. **Antibiotics.** The lowest mortality was observed in a group of patients treated with

type-specific antibiotics. A number of patients with staphylococcal parotitis have been seen who responded quickly and completely to the rapid institution of specific antibiotics as the only major treatment. In the last ten years, 34 patients received specific antibiotics in addition to other therapy. Seven died. On the other hand, 81 patients received antibiotics not known to be specific, and of these, 25 died.

In the entire group 66 glands were cultured and 64 contained staphylococci. Forty-one cultured staphylococci alone and the others contained staphylococci in combination with streptococci (20), gram negative bacilli (8) and pneumococci (2). Sensitivity data for the period 1956 through 1960 are shown in Table 4.

In view of the effectiveness of type-specific antibiotics, it is essential to obtain cultures early in the course of the disease. Usually, this can be done by milking a drop of exudate from the parotid duct. Sometimes pus can be found in the duct on the apparently unaffected side. Prior to establishment of specific sensitivities, antibiotics known to be effective against the staphylococcus currently encountered in the hospital should be used.

Antibiotics do not prevent parotitis as others have noted.² Forty-one per cent of the patients in this study were receiving antibiotics of some type at the time of onset. Ten patients were receiving either chloramphenicol or novobiocin singly or in combination.

2. Irradiation. Since 1954, among a group of 80 patients, all of whom received antibiotics, exactly one half were treated with irradiation. Ten patients treated with irradiation died and nine died in the group receiving only antibiotics. Many factors influenced the decision to use irradiation and from this data it is impossible to draw conclusions regarding effectiveness. It is our impression, however, from a review of the individual records, that irradiation is of secondary importance. It may provide

TABLE 1

Place of Origin	No. Patients
Medical ward	36
Surgical ward	67
Postoperative 51	
Nursing home	22
Home	29
Unknown-outside hospital	7

TABLE 2. Antecedent Problems in 161 Patients

Oral disease	77
Starvation	68
Dehydration	50
Postoperative	51
Nasogastric tube	34
Hip fracture	17

symptomatic relief by reducing the secretions of the obstructed gland. Irradiation is said to be more effective when given in the first 24 hours. From the point of view of symptomatic improvement, our experience supports this contention.

A recommendation for the use of irradiation, except for the relief of pain in the first

TABLE 3

Years	Total Cases	Mortality	%
-40	7	3	43
1941-45	17	8	47
1946-50	20	7	35
1951-55	43	13	30
1956-60	74	17	23

TABLE 4. Bacteriology. 1956-1960. Staphylococcus Sensitivities—37 Cultures

	Cultures	%
Novobiocin	30	81
Chloramphenicol	24	65
Oleandomycin	24	65
Erythromycin	14	38
Tetracycline	13	35
Oxytetracycline	13	35
Penicillin	9	24
Streptomycin	7	19

24 hours, cannot be made from the present study. It appears to be less important in affecting the course of the disease than antibiotics or surgical drainage.

3. Incision and Drainage. In the entire series, surgical drainage was instituted 53 times in 47 patients. Incision was seldom a primary therapy and usually followed a period of treatment with antibiotics, irradiation and supportive therapy. Usually incision and drainage was followed by rapid improvement. The following brief case report is illustrative.

Case Report

W. H., a 78-year-old man with cardiac, pulmonary, and urologic disease, underwent lysis of adhesions and an extensive resection for small bowel obstruction with gangrene. Recovery from the operation was complicated by a wound infection and a small bowel fistula. Two attempts at closure of the fistula failed. Marked deterioration and nutritional depletion followed. At this point the patient developed acute parotitis due to *Staphylococcus aureus* and fever of 38.8° C. and white blood cell count of 46,000. Despite antibiotics and early irradiation, the disease rapidly progressed to the point of obstruction of the airway and the patient seemed moribund.

Incision and drainage were instituted under general anesthesia on the third day after onset of parotitis. There was a release of extensive edema fluid and small amounts of pus, with dramatic resolution of the inflammatory process. The patient's condition improved so rapidly that within ten days, it was possible to proceed with a third attempt at closure of the small intestinal fistula which was successful. Two days following this operation, however, he developed parotitis on the opposite side which again was promptly drained and convalescence from this point on was rapid.

Twice in the course of the severe illness of this aged man drainage of acute parotitis marked a turning point to recovery when other measures had failed.

Determinations of precise indications for early drainage are difficult since there are no reliable clinical signs. Fluctuation is late. Indeed, in several cases the gland was described as nonfluctuant, just before spontaneous drainage occurred or opera-

tion proved the presence of extensive suppuration.

A guide for timing of incision and drainage of abscesses in the parotid has been formulated by an analysis of the findings at the time of operation. In the first two days after onset, 13 glands were incised. In no instance was there more than a few drops of pus while edema and necrosis were commonly encountered. On the third day, six glands were drained, in all of which small amounts of purulent exudate were found. Frank suppuration was found in three of eight glands incised on the fourth day and all but two showed small amounts of exudate. On the fifth day, frank pus was obtained from two of three glands excised. Twenty-three glands were excised six days or longer after onset. All of these contained frank pus, and in the majority it was obvious that incision and drainage should have been instituted earlier.

The mortality after incision and drainage was 30 per cent. This is higher than in the groups receiving antibiotics or antibiotics and irradiation. However, as noted earlier, most patients in this group had already failed to respond to other forms of therapy, and the most seriously ill patients are concentrated in this group.

Recommendations for Treatment

As soon as the diagnosis of acute parotitis is made, smears and cultures should be obtained by milking the duct on the involved side. Immediate attention should be directed to improvement of oral hygiene, hydration, and nutrition. If there is considerable pain and the disease is less than 24 hours old, irradiation of the gland in small doses is a reasonable procedure.

The early use of type-specific antibiotics is essential. If the patient is gravely ill, an antibiotic known to be effective against the staphylococci most commonly encountered in the hospital should be given im-

mediately. Changes can then be made as sensitivity data become available. If the disease responds promptly, no further therapy may be needed.

As soon as the diagnosis is made an attempt to drain the gland by gentle probing of the parotid duct should be instituted. If, despite these measures, the disease persists or progresses as manifested by continued fever and particularly by diffuse swelling and induration of the parotid area, incision and drainage should be considered as early as the third day. If it appears that there is moderate improvement or a lack of progression, drainage may be delayed for a day or two longer but in no circumstances if the disease continues should incision and drainage be delayed beyond the fifth day.

Surgical Technic

The technic of incision and drainage is illustrated in Figure 6. It is essentially the method recommended by Blair and Padgett¹ nearly 40 years ago and has been employed at the University of Oregon Medical School since 1940. Using the incision indicated in Figure 6, flaps of skin and subcutaneous tissue are reflected exposing the gland. A hemostat is then inserted through the capsule and opened in the direction of the course of the branches of the facial nerve. Multiple sites of drainage are thus established. The wound is packed open lightly. It has not been necessary to drain the deep lobe as described by Spratt.¹¹

In 53 operations there was no instance of injury to the facial nerve. In one case an established palsy secondary to parotitis recovered rapidly after drainage was accomplished. No deaths could be attributed to the operation or anesthesia.

Summary

1. An increased incidence of parotitis is directly related to an increase in the number of aged and very ill patients.
2. The mortality of parotitis has decreased sharply since the advent of antibiotics. Early diagnosis and treatment with type-specific antibiotics is important and may lead to prompt resolution of the infection.
3. When the disease does not respond promptly to the use of type-specific antibiotics and supportive measures directed at adequate hydration and improving oral hygiene, incision and drainage of the gland should be instituted promptly.
4. A method of therapy used over a period of more than 20 years is described and the results reported.

Bibliography

1. Blair, V. P. and E. C. Padgett: Pyogenic Infection of the Parotid Glands and Ducts. *Arch. Surg.*, 7:1, 1923.
2. Branson, B., A. I. Kugel, C. E. Stafford and E. E. Morel: The Re-emergence of Post-operative Parotitis. *West. J. Surg.*, 67:38, 1959.
3. Brown, J. V., J. L. Sedwitz and J. M. Hanner: Postoperative Parotitis; a Reappearing Disease. *U. S. Armed Forces M. J.*, 9:161, 1958.
4. Bucknall, R. T. H.: The Pathology and Prevention of Secondary Parotitis. *Lancet*, 2: 1158, 1905.
5. Crile, G., Jr. and W. R. Manning: Postoperative Parotitis. *Am. J. Surg.*, 50:664, 1940.
6. Custer, R. P.: Acute Suppurative Parotitis. *Am. J. Med. Sci.*, 182:649, 1931.
7. Gustafson, J. R.: Acute Parotitis. *Surgery*, 29: 786, 1951.
8. Petersdorf, R. G., B. R. Forsyth and D. Bermanke: Staphylococcal Parotitis. *New Eng. J. Med.*, 259:1250, 1958.
9. Power, L.: Parotitis after Diuretic Therapy. *New Eng. J. Med.*, 260:1079, 1959.
10. Robinson, J. R.: Surgical Parotitis, a Vanishing Disease. *Surgery*, 38:703, 1955.
11. Spratt, J. S.: The Etiology and Therapy of Acute Pyogenic Parotitis. *Surg., Gynec. & Obst.*, 112:391, 1961.