

## Chapter XX

### PAROTITIS AND MASTOIDITIS

#### ACUTE POSTOPERATIVE PAROTITIS

Before radiation therapy was employed for acute postoperative parotitis, this condition was frequently a fatal surgical complication. Although it probably does not occur more often than once in every 2,000 surgical cases, the morbidity and mortality should entitle the disease to more consideration than it has received in the literature on radiation therapy in the past, especially in view of the fact that x-ray therapy is so effective.

The statistics cited by Blair and Olch<sup>21</sup> place the mortality of surgical cases in which parotitis is a complication at 42.8 per cent unless operative treatment is used, in which case the mortality is 26 per cent. Bowing and Fricke<sup>22</sup> quoted Green as saying that the mortality in American statistics varies from 25 to 60 per cent. Using radium, Bowing and Fricke's mortality rate was 22.8 per cent in 184 cases. With x-ray therapy as used at present, the mortality should never exceed 10 per cent.

The etiology of acute postoperative parotitis is still obscure. Many theories have been mentioned, among them oral sepsis, seasonal influences, dehydration, reflex disturbance from peritoneal irritation and anesthetic trauma. None seems to fit very well with Bowing and Fricke's observation that this complication is 13 times as frequent following colon surgery as it is following all other surgery.

No light is shed on the possible cause in our small series from Creighton Memorial St. Joseph's Hospital, in which 19 patients recovered uneventfully, one had suppuration necessitating surgical drainage, and two died. Of these 22 cases, colon surgery had been performed in only one, unless appendectomy can be considered surgery involving the colon. One case occurred postpartum, one after abortion, and one followed implantation of radium needles in a breast cancer. The others followed laparotomy for appendectomy, synechtenterotomy, cholecystectomy and various pelvic surgical procedures. One case, not included in this group because it was not a postoperative complication,

was in a 10 year old child with empyema thoracis. The parotitis responded promptly, and rib resection was done two weeks later for the empyema. Although 14 of the 22 cases were in females, the total number is probably not large enough for conclusive evidence of a variation in frequency in sexes. All but two of the patients were over 20.

The therapy recommended in most surgical texts consists of packs, careful oral hygiene, probing Stensen's duct and surgical incision in the presence of suppuration. Rankin and Palmer<sup>23</sup> reported a definite decrease in the mortality when radium therapy was used. Bowing and Fricke's results have been quoted. Robinson and Spencer<sup>24</sup> reported excellent results with a single dose of 300 r units of high voltage, heavily filtered x-ray. Hodges and Berger<sup>16</sup> mentioned this condition as one in which roentgen therapy is valuable. Repeated small doses of low voltage x-rays have been highly effective in our hands.

In our opinion, x-ray therapy has been as valuable in surgical mumps as in gas bacillus infection. A review of many cases treated during the past few years discloses that a small group treated with x-rays stands out from the rest and suggests strongly that singular therapeutic action may be claimed for x-rays in surgical mumps. For many years, the mortality rate for surgical mumps was high. When a patient who was seriously ill contracted the disease, he died.

In our experience, and in the literature as far as we can ascertain, there are no records prior to the use of radiation therapy of any patients recovering from surgical mumps only to die a week or two later of their original disease. Anyone who had a disease serious enough to be the cause of death in a short time did not have the resistance to survive also the acute toxemia of surgical mumps. When surgical mumps developed, it was considered a terminal manifestation and the patient soon died.

In the last few years, however, several patients in whom surgical mumps developed responded promptly to x-ray therapy. But after they were free from all evidence of surgical mumps, they continued to fail because of the original illness and died in a short time.

These patients obviously did not recover from surgical mumps because of any improvement in their original disease, since they died of their original disease two to six weeks after they had

made a complete recovery from surgical mumps. The use of x-ray therapy is the only reasonable explanation, then, for their recovery from the mumps.

The ability of x-rays to overcome the toxemia and cause complete regression of surgical mumps in seriously ill patients is a striking example of their therapeutic value and ranks, it seems, with the effect secured in treating gas bacillus infection. The antitoxic effect of x-rays in acute infections deserves greater recognition, wider usage and further study.

In cases in which response was most prompt, treatment was started in the painful or early swelling stage of the disease; and when treatment is started at this time no complications occur. But if treatment is started late, after pus is present, nothing but surgical intervention and a long convalescence can be expected, or even death.

For practical clinical purposes, and to emphasize the value of early x-ray treatment, the disease may be divided into three stages:

*Stage 1.*—This, the painful stage, may be absent occasionally, but usually the patient first notices the disease because of pain in the jaw when eating. As the nurse records this in the bedside notes on the chart, the "stage of suspicion" at least is established.

*Stage 2.*—This, the stage of swelling, is characterized by enlargement of the parotid gland or tissues adjacent to it. General signs of an acute infection appear. These may be the first findings noted. This period of swelling may last a few days. It is associated with considerable toxemia and other manifestations of a severe infection. If a favorable turn does not follow and regression occurs, the gland may suppurate.

*Stage 3.*—After this, the stage of suppuration, is established surgical intervention becomes inevitable and the outcome of the case less certain. The x-rays, as far as it was possible to determine, do not cause suppuration; in fact, if treatment is started early and small doses are given at frequent intervals, the chance of suppuration seems to be diminished. If treatment is not started until the third stage, little benefit will come from x-ray therapy, but reduction of the toxemia even at this stage may be a great help.

X-rays localize the disease, relieve the pain, control the tox-

emia, in general shorten the course and lessen the chance of complications. These effects on the patient's general comfort may also be an important factor in recovery from the original disease as well as from the mumps.

Surgical mumps is one of the conditions in which radiation therapy is imperative. The mobile therapy unit makes the treatment simple, regardless of how sick the patient may be. We feel that small repeated doses at short intervals are less likely to be complicated by suppuration than one or two heavy doses at greater intervals.

#### X-RAY TECHNIC

With the mobile therapy unit, repeated treatments do not disturb the patient in any way. This is an important advantage in treating the extremely toxic patient.

The dose varies from 60 to 100 r units twice daily for at least two to four days, each involved gland being treated. We use 100 kv. and 1 or 2 mm. Al filter, depending on the amount of swelling. Good results have been obtained with low voltages when an ordinary mobile diagnostic unit has been used, and many patients have been treated with this type of equipment. Response within 24 hours is the rule, and seldom do more than 48 hours pass without definite improvement. When it is necessary to continue treatment for several days, additional filter is used and skin tolerance never exceeded.

In one case, there was definite evidence of suppuration before x-ray therapy was started. The patient was a young woman with pelvic cellulitis and peritonitis following an abortion; the complication of parotitis made the prognosis grave. Bilateral incision of the neck and drainage were resorted to in addition to x-ray therapy, and the patient recovered.

As in gas bacillus infection and peritonitis, reports on surgical mumps should include the morbidity as well as the mortality rate. In the morbidity report, the number of days in the hospital must be stated as well as whether or not suppuration occurred. If facial paralysis, parotid fistula or some other serious sequela remains as a result of the mumps, it should be mentioned.

In surgical mumps, as in other acute infections, the earlier x-ray treatment is started, the better the results, for an early

start of the treatments quite definitely lessens the complications.

CASE 71.—A. M., a woman aged 47, was admitted to the hospital September 13, 1937, for a cholecystectomy. The third postoperative day, parotitis developed on the left side. The patient was treated with x-rays twice daily for two days and once daily for two additional treatments. She improved promptly, convalescence was uneventful

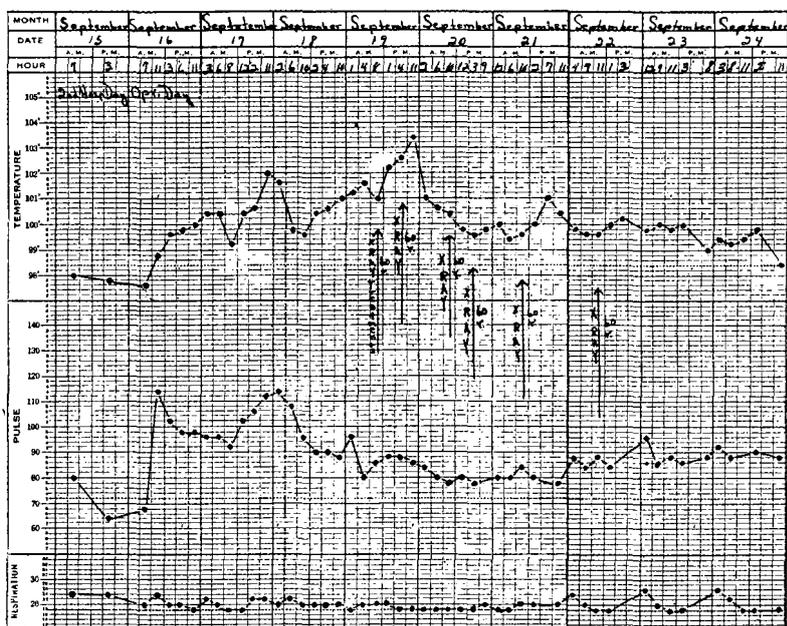


FIG. 90.—Case 71. Typical response of patient with acute postoperative parotitis. Technical factors were: 100 kv.; 5 ma.; 40 cm. distance; 1 mm. Al filter; left parotid gland as port. Result was excellent.

and she was dismissed the thirty-first postoperative day. The clinical chart (Fig. 90) shows an immediate drop in temperature at the beginning of the x-ray treatment.

X-ray therapy for this condition is truly the surgeon's friend.

CASE 72.—L. A., a youth aged 20, was admitted to the hospital October 31, 1937, for an appendectomy. The second postoperative day bilateral parotitis developed, with painful tenderness and swelling in the left parotid gland. The patient was given four x-ray treatments to each parotid area in three days (Fig. 91). After an uneventful convalescence, he was dismissed from the hospital on the sixth postoperative day.

The early diagnosis and institution of x-ray therapy undoubt-

edly permitted the early dismissal of this patient. X-ray therapy is a safe treatment for this serious complication.

CASE 73.—E. W., a woman aged 68, was admitted to the hospital June 3, 1935, with a diagnosis of strangulated inguinal hernia on the

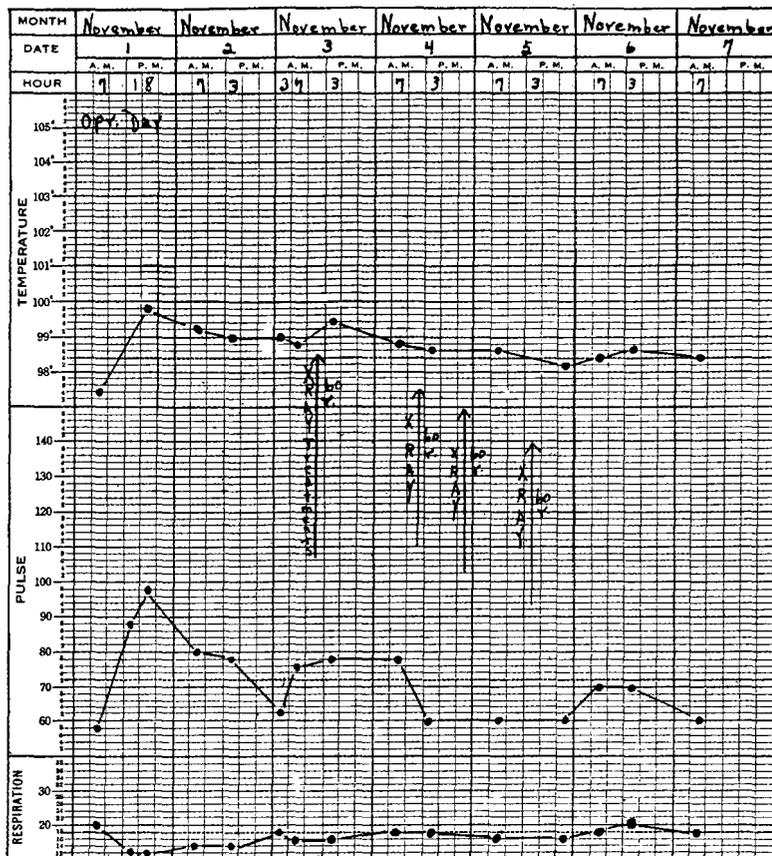


FIG. 91.—Case 72. This behavior of temperature and pulse is typical for patients who receive treatment early when first complaining of pain in the jaw. Technical factors were: 90 kv.; 5 ma.; 40 cm. distance; 1 mm. Al filter; both parotid glands as ports. Result was excellent.

right side with intestinal obstruction. She was treated expectantly until June 11. She was then operated on, and a portion of gangrenous ileum was removed, a Murphy button anastomosis was made, and an enterostomy performed above the resection. The parotid gland was swollen the day following the operation. She received one x-ray

treatment, but died the following day before further x-ray treatment could be given.

In this case the pathologic process, shock and toxemia from the abdominal condition were sufficient to cause death. The rôle played by parotitis in this case was questionable, but the case is listed among the group of deaths caused by surgical mumps. The patient received no x-ray therapy for peritonitis.

CASE 74.—S. G., a woman aged 22, was admitted to the hospital March 11, 1936, complaining of severe abdominal pain and vomiting of three days' duration. There was boardlike rigidity with abdominal tenderness, more severe in the pelvic region. The white blood cell count was 41,000, temperature 100.2 F., pulse rate 122 and respiratory rate 22.

Diagnosis was pelvic abscess, general peritonitis, paralytic ileus and septicemia. At operation on March 13, the pelvic abscess was drained and about 16 oz. of pus evacuated, and a rubber tube and two tampons were inserted for drainage. Transfusions were given March 18 and 19. X-ray treatments included one on March 19 and two on March 20. The patient died at 7:00 P. M. March 20.

This patient received no x-ray treatment for the pelvic condition and received one treatment for the mumps late on March 19, when the swelling in the parotid region was first noted, and two treatments the next day, which was the day she died. It is doubtful that surgical parotitis was the major cause of death, as it had hardly developed when the patient died. She was exceedingly toxic from the peritonitis at the time of admission and showed no improvement at any time despite surgical drainage, blood transfusions and other measures. We were unable to secure permission to treat the peritonitis, and we believe that if the best results were to be obtained we should have treated both conditions.

CASE 75.—T. McM., a woman aged 62, was hospitalized December 7, 1937. Diagnosis on admission was chronic cholecystitis with stones and ascites. She was operated on December 13, when she was found to have empyema of the gallbladder with multiple stones, and about a gallon of free fluid in the peritoneal cavity due to acute hepatitis. Twelve gall stones were removed. The suction apparatus was inserted shortly after the operation and left in about 20 days. On January 4, 1938, the right parotid gland was swollen and sore. She received two x-ray treatments on the fourth and two on the fifth. The mumps promptly subsided, but the stormy course continued. The suction apparatus was re-inserted January 6 and left for several days. On

January 9, bedsores added to the distress. The patient died February 8, without recurrence of the surgical mumps.

This case is one in which the effectiveness of x-rays in surgical mumps is evident. Despite the serious illness, the patient had fully recovered from the mumps long before death. This was practically unheard of before the use of x-rays. Patients as ill as this patient were never able to live through the toxic phase of the mumps when it was added to another serious disease.

CASE 76.—N. L., a woman aged 72, was hospitalized September 10, 1937. The diagnosis was complete uterine prolapse. The day after admission vaginal hysterectomy and plastic repair were done. The temperature had reached 101 F. daily until the diagnosis of pelvic abscess was made. This abscess was drained by way of a posterior colpotomy September 25. The course continued to be somewhat stormy. Pain and swelling of the left parotid gland were noted October 19. Two treatments were given on this and the following day, one on October 21 and on each of the following three days. The mumps responded, but the patient's condition continued to grow worse despite a transfusion on October 30. Death occurred November 5.

Death occurred after the surgical mumps had apparently subsided. Again, surgical mumps which developed during a long, toxic process seemed to be entirely controlled, but the patient's general condition continued to be poor and death finally intervened.

CASE 77.—J. H., a man aged 23, a medical student, was admitted to the hospital March 18, 1938, with a diagnosis of acute appendicitis. He was operated on the same day. Convalescence was stormy. An abdominal abscess developed which was drained on the twenty-seventh hospital day. Two days later severe bilateral parotitis was present. The temperature reached 103.8 F. and the patient was decidedly toxic. X-ray therapy was started, the temperature dropped promptly, and toxic manifestations quickly responded (Fig. 92). He received six treatments in five days.

The attending surgeon was skeptical at first, but the results in this case served to make him more friendly to x-ray therapy for surgical parotitis.

#### SUPPURATIVE PAROTITIS, NONSURGICAL

CASE 78.—E. C., a woman aged 77, was hospitalized April 22, 1936. The provisional diagnosis was senility with a complication of suppurative parotitis. Her chief complaint was swelling and pain over

a definite problem when x-ray therapy is considered, because some organisms respond much more readily than others, at least in our present system of treatment with x-rays. As time goes on and accurate records accumulate on established types of infections, the data will probably lead to a more successful technic for infections which are stubborn or entirely resistant to x-ray therapy. Some organisms appear adequately controlled with the present-day technic, and no change or little change seems indicated or desirable. Others are still not responsive, and more study is indicated before the correct technic will be found.

#### 1. Acute Simple Mastoiditis with and without Suppuration

This localized infection generally responds well to irradiation. If the causative organism is sensitive to irradiation and x-ray treatments are given in the early stage or even in the most active stage, the results are good. As in other infections, the earlier treatment is started, the more prompt the response and the better the result. Irradiation during the early stage will often abort the infection and render surgical intervention unnecessary.

Obviously, x-ray treatment started in the late stage of the disease after destruction of cell walls has taken place and the abscess cavity is formed will be less effective and surgery will be necessary. In this type of case, a treatment or two preoperatively, then more treatment after operation and after drainage is established have been of definite help in shortening the course of the infection even at this late stage. The point to remember, however, is that when the mastoid cells have been destroyed, surgical intervention is indicated. In any event, irradiation preoperatively is decidedly beneficial and should not be neglected.

#### 2. Postoperative Suppurative Mastoiditis

When x-ray therapy is started in the late stage, after operation and after drainage is established, it is still of some value if started within a few hours of operation. It aids in localizing the disease, which otherwise takes on renewed activity in tissues to which it has just gained access as a result of the operation. Those who object to irradiation before operation certainly have

no legitimate excuse for refusing x-ray treatment immediately after operation.

If x-ray treatment is delayed until two weeks or longer after the operation, the infection is much less responsive. It is doubtful that any good will come from such delayed therapy, or that it is even indicated. At this late stage, however, it is worth trying in the desperate case; in the occasional case, it may end the seropurulent discharge and greatly hasten recovery. This result is the exception and not the rule. In cases treated late, the course generally continues, and unless a secondary operation is necessary, x-rays do little good.

If another operation is indicated, preoperative irradiation and therapy continued immediately after the operation for a few days will do a great amount of good.

#### 3 and 4. Osteomyelitis of Bones Adjacent to Mastoid; Mastoid with Reactivation of Old Infection

These conditions, as well as old mastoiditis which suddenly becomes actively infected, call for judicious pre- and postoperative x-ray treatment. Except for localizing the infection after each new surgical procedure, it is not as clearly indicated as in some of the other mastoid conditions. A longer preoperative course of radiation than is usually given may be necessary to localize the infection thoroughly. Operative procedure should not be undertaken, if it can possibly be avoided, until the infection is localized. X-rays are one agent which may be applied well beyond the known limits of infection and repeatedly applied to the tissues with the assurance that they will lessen the extent of the infection, make it more accessible to surgical intervention and do no harm to the normal structures.

#### 5. Specific Mastoiditis

Mastoiditis which develops as a complication of pneumonia or some other specific disease may call for specific therapy. But x-ray therapy may be all that is necessary in other cases. X-ray and specific therapy may be used in combination. The most important thing is early diagnosis and treatment.

In Case 79, the diagnosis of pneumonia and mastoiditis was made on admission to the hospital. Because of the lung involvement, x-ray therapy was decided on, and operation was deferred

to see what effect the x-rays would have. Five x-ray treatments were given to the ear and to the chest in three days, at the end of which time the temperature had become normal.

## X-RAY TECHNIC

The mastoid area should be carefully charted as one gives the treatments. One should figure not over 500 r as 100 per cent, and although the fields are small, usually 10 to 12 cm. in diameter, the dose should be fairly conservative. About 80 r per

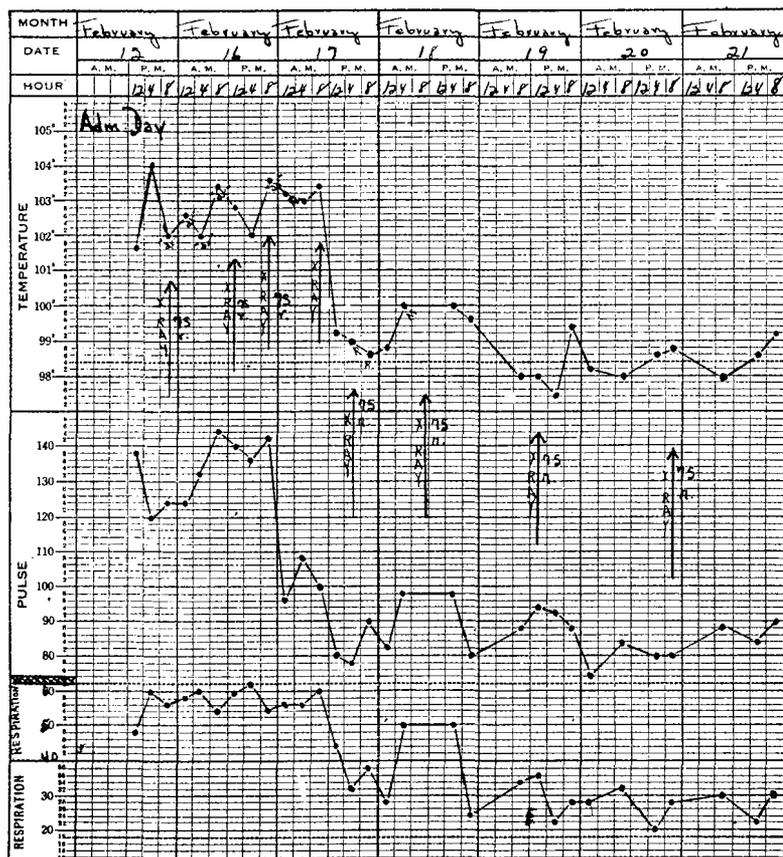


FIG. 93.—Case 79. Drop in temperature, pulse rate and respirations followed treatment of demonstrable evidence of a pathologic condition in the lungs and left mastoid cells. Technical factors were: 100 kv.; 5 ma.; 40 cm. distance; 3 mm. Al filter; left mastoid and anterior chest as ports. Result was excellent.

dose should be adhered to until the upper margin of saturation (for example, 90 per cent) is reached, and then reduced to 25 r per dose. As in other acute diseases, one may start with higher dosage and go to smaller dosage after some response has been obtained.

CASE 79.—L. J. N., a girl aged 8, was hospitalized February 15, 1939, with pain in the chest and in the left ear. The white blood cell count was 29,700, temperature 104 F. and the respiratory rate 48. X-ray examination showed involvement of the left mastoid area and an area of consolidation in the left lung. One x-ray treatment was given to the chest and mastoid on the day of admission, two daily for the next two days and one treatment daily for the following three days. The temperature reached normal the third hospital day (Fig. 93). The patient was dismissed the tenth day. The response was prompt without the use of any other therapeutic measures, although surgery would probably have been done early had the chest complication not been a contraindication.