hensive, and the extremes of age were 12 hours (repair of exomphalos) and 91 years (cholecyst-gastrostomy). Even in the presence of infection (for example, 76 appendectomies, in many of which free pus was present) there was no tendency for the sutures or ligatures to be extruded. Colostomies, too, have been closed without trouble. Wounds healed rapidly and soundly, and with a noteworthy freedom from complications. Sutures have been removed on the sixth post-operative day, as a rule, in abdominal cases, and it has been my experience that it is not safe to remove them so early when catgut has been buried in the wound, particularly if the superficial fascia has been sutured with it. On several occasions, when a second operation was necessary, the previous nylon sutures were found to have a minimum of surrounding fibrosis. The cases have been followed up for periods of from 1 to 9 months and no symptoms referable to the buried nylon have been elicited.

Technique

Several points of technique should be mentioned. Sterility is achieved by immersion in boiling water for 30 minutes. For nearly all purposes the fine (No. 3) monofilament nylon, prepared in 40-inch lengths, is used, the strong (No. 5) being reserved for the ligation of large vessels and where there is tension. Suturing is facilitated by tying the nylon to the eye of the needle with a half-knot. At first Halsted's principle of universal interrupted sutures was adhered to, but it was soon found that continuous sutures could be used with impunity.

It has been said that monofilament nylon is difficult to use because of its springy nature, its smooth surface which makes knots tend to slip, and the small diameter which makes it difficult to feel between the fingers. The technique of using it is easily acquired, however, and it soon becomes very pleasant material to handle. The smoothness with which it glides through the tissues is quite a revelation after catgut or silk. The so-called "nylon knot" is tedious to tie, and it slips easily; the one which I employ is made by tying two half-knots with one end—the long one—held taut (Fig. 1). The ligature is run up tight, and is locked by a third half-knot tied with the short end held taut (Fig. 2). This knot does not slip,

FIG. 1

FIG. 2

and I have used it in the ligation of large vessels, including the femoral artery. Long ends should not be left, and assistants are trained to cut them close to the knot. Tension sutures are not employed, for I am not convinced that they contribute materially to the strength of the wound, and they produce unsightly scars across it and delay healing.

It is not suggested that there is no place for catgut. I still employ it for the mucosal sutures in most bladder and stomach operations, because non-absorbable sutures may cause trouble in these sites. Nevertheless, for nearly all sutures and ligatures nylon has definitely established its superiority in my cases. An additional consideration is the fact that the cost of nylon for surgical work is only one-eighth that of catgut.

Summary

The presence of catgut in a wound leads to increased inflammation and induration, greater exudation of serum, delay in healing, and an increased incidence of wound infection and breakdown.

Silk, linen, and cotton threads are free from these disadvantages, but may cause great delay in healing if infection is present.

Nylon causes a minimum of tissue irritation, and its use as a buried suture material in 300 operations has shown its superiority to the materials in common use. Wounds healed rapidly and with no complications.

I wish to express my thanks to Prof. Burn, of the Pharmacology Laboratory, Oxford, for providing the facilities for the animal experiments.

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Medical Memoranda

Parotitis due to Unusual Foreign Body in Parotid Duct

References in the literature to foreign bodies in the salivary ducts are few. Mittermaier (1929) mentions "bristles, fish-bones, hair, grain and seeds, splinters of wood, etc."; Illingworth and Dick (1941) state that "on rare occasions a foreign body, such as a piece of straw, a fruit seed, or mycelia of actinomycetes, may form a nucleus for stone formation"; and Tramer (1938) reported a case in detail. The following account may therefore be worth recording.

CASE HISTORY

The patient was a girl aged 6 years who complained one evening of pain in the right side of the neck, which within a few hours had become swollen below the ear. On examination next day the right parotid gland was moderately enlarged and tender, and thin purulent fluid was seen escaping from the orifice of the right parotid duct. The mouth and throat were otherwise normal, and nothing could be felt on palpation of the duct; the temperature and pulse were 100.5° F. and 120 a minute respectively.

The following day the temperature was 98.4° F. and the pulse 100, but the local swelling and tenderness were more marked. After cleansing the mucosa round the duct orifice with spirit before taking a swab of the pus, slight pressure was made on the duct. Purulent fluid appeared from the opening, and was followed by what seemed to be a bristle, one portion (the last to leave the duct) of which was coated with pus. Chewing-gum was given to help drainage by stimulating the salivary flow, and a course of sulphapyridine was started. The fluid seen flowing from the duct next day was indistinguishable from normal saliva, and as it seemed unnecessary the sulphapyridine was stopped after a total of 6 g. had been given. Two days later the gland was no longer enlarged; the temperature was normal, and, except for slight local tenderness, which disappeared after a further five days, recovery was complete.

Dr. J. B. Penfold examined the pus and the foreign body and reported as follows: "Film: Many pus cells, few epithelial cells, and numerous mixed organisms. Culture: Mixed growth of normal mouth organisms. Foreign body: Husk of seed 6 mm. by 1.5 mm. diameter, with tail 4 mm. long." He submitted the husk to Dr. E. J. Salisbury, Director of the Royal Botanic Gardens, who identified it as "a floret of one of the cultivated forms of the common rye grass, *Lolium perenne*. This form has a fairly long finely barbed awn, which was no doubt responsible for setting up irritation."

Foreign bodies are more common in the submandibular duct on account of its larger size and the position of its orifice on the floor of the mouth (Mittermaier, 1929). Both the site and the nature of the foreign body are unusual in this case. Tramer (1938) describes the case of a child 6 years old who developed parotitis lasting, with fluctuations in its severity, for well over one month: on the forty-first day an incision was made into the parotid, from which pus (giving a mixed growth of organisms) discharged for 31 days. A foreign body was seen in the wound on the thirty-first day and removed; at the end of a further six days the wound was healed completely. The foreign body proved to be a fragment of grass seed, consisting of a husk and a piece of stalk, but was too incomplete for exact identification.

The present case and that of Tramer both occurred in young children, who are more likely than adults to put unusual objects in the mouth. In this case the possible origin of the husk from some cereal food is rendered unlikely by its completely undamaged condition, and as the child lives on a farm she has ample opportunities for eating raw grass seeds.

I wish to thank Dr. J. B. Penfold, pathologist to the E.P.S. Laboratory, Billericay, and Dr. E. J. Salisbury, Director of the Royal Botanic Gardens, Kew, for examining the specimens.

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A Domestic Case of Chlorine-gas Poisoning

During the past few years much time and much energy have been devoted to the detailed organization of schemes for dealing with the effects of the possible use of gas warfare by the enemy. Fortunately these schemes so far have not been put to the test, and as a result the personal knowledge of many of us on this subject is almost entirely theoretical. It was therefore with no little interest that a clinical case of chlorine-gas poisoning came to our notice recently, and it is rather ironical to reflect that this solitary gas casualty occurred as a result of mixing two common household cleansing agents. The history of the case was as follows.

CASE HISTORY

At about three o'clock one afternoon Mrs. X., a Birmingham housewife, began to clean her bath. Her husband had recently decorated the bathroom and she was particularly anxious to remove all stains from the bath, and accordingly decided to use both harpic and parozone. She sprinkled harpic liberally into the bath, using about 2 oz., and then poured on about half a pint of parozone. The bath was quite dry at the time and the door of the bathroom was closed. She noticed the sizzling which occurred on mixing the two substances, but did not attach any importance to it, and as she had lost her sense of smell in childhood she remained quite unaware of any possible danger, and continued with her cleansing, leaning well over the bath for the purpose and scrubbing vigorously. Her eyes soon began to water and she felt a pain in her chest on breathing; then she must have fainted, because the next thing she remembers is lying on the bathroom floor. She couldn't stand up, but crawled to the head of the stairs and eventually got down them and out into the garden. Here she was violently sick. Breathing was very difficult and painful; she felt as if she was choking, and was quite certain she was going to die. There was no one else in the house and, finding that her voice was too weak to call for assistance, she threw stones to attract her neighbours, but was unsuccessful in doing so. After a considerable time she managed to crawl upstairs and on to her bed, where she was found by her family on returning from work between 5 and 6 p.m.

One of us (L.M.) saw the patient about 7 p.m. and found her lying on her right side on the bed fully dressed. Her breathing was obviously distressed, the lips were cyanosed, and the pulse was strong and regular and the rate 100. Rales and sibilant rhonchi were present over the front and sides of the chest: a detailed examination was not deemed advisable because of her general condition. Treatment consisted of rest in bed and an expectorant mixture, but on the following day a linctus had to be substituted for the expectorant mixture because of incessant coughing. Her progress was satisfactory, and she was allowed up after three days; but three weeks later she still complained of unusual fatigue.

COMMENT

It was decided to investigate the effect of mixing parozone and harpic, and accordingly samples of each were bought and submitted to the city analyst, who reported as follows:

"Parozone is a solution of sodium hypochlorite containing 5.8 w/v of available chlorine. Harpic is impure acid sodium sulphate containing 77% NaHSO₄. Harpic, acting as an acid, liberates the chlorine from parozone. If 1 oz. of parozone is mixed with 1/3 oz. of harpic all the available chlorine is liberated and about 1.4 g. (equal to 500 ml.) of the gas would be given off. This amount would be reduced considerably if water were added, the solubility of chlorine in water being about 8 g. per litre. The limit of insupportability—i.e., the highest concentration which a person can breathe for 1 minute—is given as 100 mg. per cubic metre, so that a mixture of 1 oz. of parozone and 1/3 oz. of harpic would produce 14 cubic metres (equal to 450 cubic feet) of insupportable air. An average bath would have a capacity of approximately 50 cubic feet."

The 2 oz. of harpic used by Mrs. X. would be enough to liberate all the available chlorine from 6 oz. out of the 10 oz. of parozone used, so that about 3,000 c.c.m. of chlorine gas must have been given off, and as the bath was quite dry all the gas would remain in the atmosphere. Being a relatively heavy gas, the highest concentration would be expected in the bath itself, and as Mrs. X. leant well over the bath, and was presumably breathing fairly heavily

from her exertions, there can be little doubt that she must have inhaled an appreciable quantity of chlorine gas. It is likely that anyone with a normal sense of smell would have withdrawn from the atmosphere very much sooner than the patient did, and for this reason no general conclusions should be drawn from this isolated case.

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A Case of Accidental Intestinal Myiasis

The following case seems to be interesting enough to be placed on record.

CASE REPORT

A previously perfectly healthy man of 22 was carried into sick quarters at 10 o'clock one morning, having suddenly collapsed. He had felt quite well when he got up at 7 o'clock, was very hungry, and ate a good breakfast. Approximately 1½ hours afterwards he suddenly "broke out" in a cold sweat, nearly fainted, and then had a violent urge to defaecate. This proved impossible. He had no tenesmus. This desire to defaecate was immediately followed by nausea, severe vomiting, and vertigo. At no time did he have abdominal pain.

On examination the face was pale, the skin cold and clammy. The pulse rate was 64, weak but regular, and respirations were 16 a minute. The temperature was normal. The tongue had a heavy white coat, the pharynx was normal, the breath was not foul. The eyes were normal, the pupils being equal and reacting normally to light and accommodation. The abdomen and all other systems showed no abnormality on careful examination. The patient had vomited violently before arrival at sick quarters, and consequently the vomit was not available for examination, which later proved rather unfortunate.

He was admitted and put straight to bed, with hot bottles. No food was permitted, and an excessive fluid intake was encouraged. He was retching continuously, but did not vomit again. The retching was successfully treated with a few drops of tincture of iodine in water. During the afternoon his bowels moved once, but beyond being rather loose showed no other obvious abnormality. The next morning all nausea had vanished. He passed a very loose motion which was full of blood and mucus. This specimen was sent to the laboratory, and the following report was received: "Pus, blood, mucus, and macrophages present. Faecal debris, nil. No ova or parasites seen. Culture: No pathogens isolated." An ounce of castor oil was given and the starvation diet continued, the patient being allowed only fluids. In the evening he developed a temperature of 101° F. and a severe frontal headache; the next morning, however, the headache had gone and the temperature was normal. The patient himself was looking and declared that he felt much better, though still rather weak. He had a strong desire to eat. No physical signs were found in the abdomen. The motion was still very loose, and contained a large proportion of blood and mucus. It was also found to contain large numbers of live, highly active larvae. These were at once isolated, sent to the laboratory for identification, and proved to be the larvae of *Stomoxys calcitrans* (the stable fly), a fly reported to be capable of producing intestinal myiasis. He was given a further ounce of castor oil, and during that day his bowels opened five times. Each motion contained macroscopic blood and mucus, but no more larvae were passed. On the morning of the third day of the illness the patient was feeling considerably better, and had by then developed a ravenous appetite. The diarrhoea had cleared, but the two specimens he passed that day both contained more larvae, though these were no longer active. A further specimen was examined at the laboratory, and the report received was: "A few pus cells and undigested vegetable cells. Larvae still present."

On the fourth day only one motion was passed. This was normal, and no further evidence of larvae was found. On the morning of the fifth day another normal motion was passed, and the patient appeared to have recovered completely. No larvae could be found. The patient was allowed to eat, and in the evening he was permitted to get up. The next day he was given a full diet and allowed to walk around the ward all day. All symptoms had cleared, bowel motions were normal, and no further evidence of larvae appeared. He was finally discharged on the morning of the seventh day of the illness apparently completely recovered, and no relapse of symptoms had been reported up to the time of writing this report, 14 days after discharge from sick quarters.

On finding the larvae, coupled with the fact that the patient had a strong desire for food—an unusual finding in a patient suffering from acute bacillary dysentery—supported also by the fact that culture of the faeces had produced no pathogenic growth of organisms, a diagnosis of intestinal myiasis was made. In view of the species of larvae discovered it was felt that this case was almost certainly "accidental." On questioning the patient he stated that a few days previously he had eaten a large number of cherries and plums, which he had not washed, and that he had placed them whole in his mouth without first examining them or removing the stones. It is believed that this constituted the source of infection. The fruit must have been harbouring the larvae round the stones, and the patient had eaten them, subsequently developing the acute attack described.

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