CASE III.

F. C., aged 26, was admitted on October 22nd, 1928. For four years he had been suffering from attacks of acute left-sided renal colic, which came on every four or five days. He had intense thirst, frontal headaches of the morning type, and had lost a great deal of flesh. The blood urea index was high, and the phenolsulphonphthalein excretion was low. The specific gravity of his urine was 1005, and contained albumin. X rays showed a number of shadows in both renal areas. As pyelography showed that the shadows fused with the pyelogram shadows, a diagnosis of renal calculus was certain.

A left-sided nephrolithotomy was recommended because of the severe pain, but it was clear that the total amount of renal tissue was so defective that nephrectomy was contraindicated. An operation was a serious undertaking, and had to aim at the least possible damage to the kidney.

The left kidney was exposed and found to be twice its normal size. None of the calculi could be felt through the renal tissue. X rays (Fig. 5) showed multiple stones, also their location. The incised part of the kidney showed marked deficiency of the normal renal tissue, which was largely replaced by fibrous fat. The stones were extracted, and it was thought that all of them had been removed. A further radiogram showed, however, that one rounded stone remained. It was easily located and removed (Fig. 6—the small shadow near the pelvis was a "fault" on the film; it does not show on the previous radiogram). The removed calculi were composed of uric acid.

The patient stood the operation well, but died from uraemia eleven days after. A post-mortem examination revealed that all calculi had been removed from the left kidney, while the other kidney contained multiple calculi and was in a similarly severely damaged condition. Despite the fact that the operation was performed quickly, with as little damage as possible to the kidney, the total renal tissue was insufficient to stand the strain.

CASE IV.

H. A. C., aged 52, male, underwent an operation for a right-sided renal calculus in 1920. The surgeon who performed the operation subsequently informed me that a prolonged search had had to be made for the calculus, and the convexity of the kidney was slit up from pole to pole. The stone, a small one, was ultimately recovered. In 1926 he developed attacks of acute left-sided renal colic with haematuria, and x rays showed a shadow in the left kidney area.

Seen by me in October, 1928, his phenolsulphonphthalein excretion was 55 per cent., while his blood urea was 38 mg. per 100 c.cm.—an indication of a good total renal function. Cystoscopy showed frequent jets of urine coming from the left ureteric orifice. No urine was observed coming from the right ureteric orifice. Ureter catheterization enabled normal urine to be withdrawn from the left kidney with a 10 per cent. phenolsulphonphthalein excretion in fifteen minutes, an indication of an exceptionally good renal function. No urine was obtained from the right-sided ureter catheter, and a subsequent investigation showed that the catheter lumen was patent. Double pyelography (Fig. 7) showed a normal left-sided pyelogram. On the right side the ureter and a rudimentary pelvis were shown distended with the solution of sodium iodide, but the calyces had vanished.

It is fair to assume, therefore, that the right kidney was so much damaged at the nephrolithotomy that it had become functionless. It is also fair to assume that had the method of x-raying the exposed right kidney at the time of the 1920 operation been available, the small stone would have been detected before the organ was opened, resulting in only a localized damage instead of the kidney being rendered completely functionless.

The operations in Cases i, ii, and iii were performed in a private hospital. The pyelogram of Case iv was made in the same establishment, but on a separate, more powerful, x-ray plant.

CONCLUSIONS.

1. Radiography of an exposed kidney is a method which has come to stay. It is helpful in guarding against the recurrence of a stone.

2. Detection of the exact site of a renal calculus by radiography is invaluable in preventing the needless sacrifice of renal tissue.

3. Illustrative cases are given: (1) of a previously known renal calculus; (2) of an occasion when a uric acid stone was suspected but whose presence could not be proved prior to radiography of the exposed kidney; (3) of a man in whom, after supposed removal of all the calculi, a remaining one was detected by radiography and removed; (4) of a sequel to a nephrolithotomy performed eight years before, the result being a functionless kidney owing to the extensive trauma at that operation.

THE TREATMENT OF PARANASAL SUPPURATION PERSISTING AFTER OPERATION.*

BY

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WHEN I agreed to take part in opening this discussion, I did so realizing that I had nothing original to offer and that I could therefore only give the results of my personal experience and perhaps, to some extent, emphasize what seemed to me to be the fundamental problems to be solved. I find that it is necessary to define the meaning of the subject chosen. We must presume that such operative intervention as has been carried out has been skilfully and adequately performed. The decision as to the adequacy of operation in such cases is, in itself, a difficult one. In considering this, I take it that ventilation and drainage of the affected sinuses are the essentials. In addition, in the case of the frontal sinus and possibly also of the antrum whose lining has been removed, complete obliteration may be produced. While ventilation and drainage will cure the majority of cases, it will not cure all, and obliteration has only a limited application. Confining, then, the scope of our discussion to cases in which further operation is not advised, I suggest a classification into two groups: (a) those in which there is some discoverable factor which is perpetuating the suppuration; and (b) those in which such a factor cannot be identified.

Dealing first with Group (a), I feel that this class merits some consideration, as I find that it contains an appreciable number of cases seen by myself. The undiagnosed factors of which I have had experience have been: the existence of a syphilitic or tuberculous infection; the existence of malignant disease; and the presence of a foreign body or of a bony sequestrum. The presence of an old-standing syphilitic infection is not very uncommon, and its recognition and treatment may be all that is necessary to clear up a case.

Tuberculosis is, in my experience, very much less common, but its occasional occurrence is exemplified by the following case which has recently come under my observation.

The patient, a woman aged 52, had had recurrent intranasal and external operations on the paranasal sinuses of both sides over a period of fifteen years without any relief. In addition to multiple operations, her frontal sinuses had been washed out over long periods, and the antra for twenty-five years. I found the nasal passages full of pus and crusts. The nasal mucosa presented a granulomatous appearance, and, on section, showed the typical histological picture of tuberculosis. In early life she had had tuberculous glands removed from either side of the neck, and this might have afforded a clue to the nature of the infection.

The occurrence of malignant disease, as a sequel to sinus suppuration, is not, I believe, very unusual. This combination tends to delay diagnosis, the previous existence of suppuration distracting the observer's mind from the malignant factor. I can exemplify this by the case of a woman, aged 46, who had worn an antro-alveolar plug attached to a dental plate for ten years, syringing pus out of the antrum daily. She consulted me, owing to aching and a slight swelling in the cheek on the affected side; when I had treated her for a period as a case of simple chronic suppuration, the existence of a squamous-celled carcinoma, involving the anterior wall of the antrum, became evident.

The type of foreign body most frequently met with is probably a tooth fragment in the antrum. I can best illustrate this occurrence by relating the following case, which has already been published.¹

A man, aged 24, had been complaining for eight years of a right-sided frontal headache and offensive nasal discharge. Examination revealed a chronic suppuration in all the anterior group of sinuses on the right side. Intranasal, and later external, operations were performed without relief, but the suppuration cleared up rapidly following the spontaneous expulsion from the right side of the nose of a concretion, with a tooth fragment as a nucleus. This fragment had been present in the antrum since the extraction of a molar tooth at least ten years previously. After expulsion of the concretion, which had evidently passed out of the antrum into the nose, through the opening made at operation, a further and more careful

* Read in opening a discussion in the Section of Laryngology and Otolaryngology at the Annual Meeting of the British Medical Association, Winnipeg, 1930.

examination of the original skiagram demonstrated its presence in the antrum.

As to a sequestrum, we are probably familiar with cases, particularly of chronic antral suppuration, in which resolution is delayed after operation until the extraction or spontaneous expulsion of a fragment of dead bone.

The treatment of the cases in Group (b) is, I understand, the primary object of this discussion. We have to consider their treatment from two points of view—namely, local and constitutional. Possible methods of local treatment seem to be: repeated washing out of the sinus or sinuses; the use of suction to empty them; the application of antiseptic packs to prevent drying and to increase secretion; the use of oily applications for the same purpose; the employment of ionization with the idea of attacking the infection in the mucosa; and perhaps the use of radium.

Experience has led me to believe that washing out should be avoided as far as possible in both the immediate and late post-operative stages. It seems to me to introduce a risk of spreading infection both to previously uninvolved regions of the nose and throat and to the ears without producing any favourable effect on the condition for which it is used. I am of the opinion that the secretion should be got rid of by hawking or blowing and that an attempt should be made to keep an oily film over the surface of the mucosa to prevent drying and crusting. I have had no encouraging results from the use of antiseptic packs with silver preparations, etc., but my experience with them is not extensive. The technical difficulties in employing ionization in the paranasal sinuses are considerable; I have had no personal experience of the method, but, in view of the favourable results which have been obtained by its use in cases of infection of the mucosa of the middle ear, a thorough trial would seem to be worth while. I have found that by using a relatively large dose of radium, only lightly screened, for a short time, an improvement is produced in cases of resistant ethmoidal infection with polypi. A vigorous reaction occurs, and at the end of two or three months the local condition has been much improved. I do not know if it has been employed for purely suppurative cases; if not, I should think a cautious trial would be justifiable.

Treatment from the constitutional side is more difficult. You have probably been struck by the great variation in the degree of general constitutional disturbance accompanying chronic sinus suppuration. While some patients are more or less invalids, with muddy complexions and constant headaches, others, although their noses are constantly producing pus, are rosy-cheeked and never have a headache. I have been impressed by the slight degree to which infection and new growth of the nasal sinuses involve the lymphatic system. As long as infection remains within the nose, any evidence of involvement of the lymphatic glands is very unusual, while a spread to the skin, nasopharynx, or pharynx at once produces a lymphatic infection, as shown by enlargement of the glands. I wonder whether this lack of absorption into the lymphatics may not be one reason why the body does not develop an adequate resistance to the infection. If so, one would expect good results with vaccines. Personally, I have found them of little, if any, use in chronic cases. Anything which improves the general condition of the patient may be expected to have a favourable influence on the sinus suppuration, although, as I have already said, constitutional and local improvement do not, by any means, always go together.

There is one factor which I believe to be of the utmost importance and one which is frequently neglected—namely, time. I have lived long enough to have seen cases which I regarded as incurable clear up with the passage of years, and I strongly advise that a very ample margin of time should be allowed to elapse after operation in these cases before judging of the result, and particularly before deciding on any further operative treatment. Many a patient has become a mental wreck through repeated operations which have not even improved the nasal condition. In my opinion, provided reasonable drainage exists from the nasal sinuses, headaches, if present, are due to a general neurasthenia rather than to the secretion of pus in the nose. Repeated operations do not relieve such cases, but merely make them worse.

REFERENCE.

¹ *Journal of Laryngology, Rhinology and Otolaryngology*, 1927, p. 192.

AVERTIN.*

BY

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THE production of general anaesthesia is almost invariably effected by the inhalation of volatile substances. This method has attained popularity for two reasons: first, on account of the wide therapeutic margin of the volatile drugs available, and secondly, on account of the facility of administration which permits the anaesthetist to control and regulate accurately the depth and duration of anaesthesia. Furthermore, absorption by this method is almost as rapid as by intravenous injection.

Non-volatile anaesthetics must be given either by the mouth, the rectum, or intravenously, the choice of method being governed by the properties of the individual anaesthetic. There are three groups: (1) liquids with too high a boiling point for administration by the lungs, paraldehyde being an example of this group; (2) alkaloids such as morphine and hyoscine; and (3) solid substances, often very insoluble in water, which act by virtue of lipid solubility. This last group includes chloral and its derivatives chlorotone, chloralose, and isopral; sulphonal and methylsulphonal; veronal with its derivatives sodium veronal, luminal, and pernocton; and urethane with its derivative hedonal.

All these drugs are excellent hypnotics, but as a general rule they are unsuitable as anaesthetics because the therapeutic margin is insufficient. A dose that will produce insensibility and render the patient free from pain does not necessarily produce a corresponding degree of immobility; in some instances the anaesthesia lasts so long that the use of the drug is impracticable. Unless a non-volatile anaesthetic can be administered by continuous intravenous infusion it must be given in a single dose, usually per rectum, and this has the disadvantage that when it has been absorbed it is impossible to control its action further. In addition, there is always the risk of local irritation upon the rectal mucosa. Such non-volatile drugs cannot be excreted rapidly, if at all, by the lungs; they are eliminated comparatively slowly by the urine, sweat, or faeces. For these reasons it is impossible to ensure a constant concentration of the anaesthetic in the blood and tissues, a condition easily attained when volatile anaesthetics are employed; with this group, therefore, it is impossible to maintain the patient at a constant level of anaesthesia without the risk of overdosage. The quantity to be administered must be calculated in proportion to the body weight of the patient; this method is the best at our disposal, and yet it is unscientific, because it takes no account of his age, temperament, or infirmity. Further, if we accept the view that anaesthetics act by virtue of lipid solubility, the obesity of the patient must be taken into consideration when estimating the correct dose. There is no need for accurate dosage with a volatile anaesthetic, because there is a close correlation between the amount administered and the depth of anaesthesia. With such difficulties to overcome the introduction of a new non-volatile anaesthetic may appear unnecessary, but it must be remembered that even volatile anaesthetics do not give entire satisfaction. If the ideal anaesthetic is considered as one which is absolutely safe for the patient, produces complete insensibility and immobility, and is simple in administration the defects of the volatile type are at once apparent, and therefore the properties of any new anaesthetic should be critically examined.

Avertin, or tribromomethylalcohol, is one of the latest non-volatile anaesthetics; it was first prepared by Willstätter and Duisberg²⁵ in 1926 by the reduction of bromal. It is an odourless white crystalline powder containing 85 per cent. of bromine, and soluble in water to the extent of 3 per cent. at 37° C.; but the powder dissolves very slowly, taking more than forty-five minutes, though aided by vigorous shaking to produce a clear solution. This was a serious disadvantage, but the drug is now issued already dissolved in amylene hydrate in the proportion of 1 gram

* A paper read in the Section of Anaesthesia at the Annual Meeting of the British Medical Association at Winnipeg, 1930.