c.mm., with a differential count showing 65 per cent. lymphocytes and 28 per cent. polymorphonuclears.

(e) *The erythrocyte sedimentation rate* is shown to be slightly retarded or normal in almost all uncomplicated cases of whooping-cough in the early stages, with a slight increase in the later stages of the illness.

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HUMAN OIL IN THE TREATMENT OF ADHERENT SCARS

BY

CECIL P. G. WAKELEY, D.Sc., F.R.C.S., F.A.C.S.,
F.R.A.C.S. (Hon.)

Senior Surgeon, King's College Hospital and West End
Hospital for Nervous Diseases

Adherent scars are always a problem, and especially so when adherent to bone or cartilage. Some five years ago, when confronted with two cases of extensive adherent scars in the neck due to x-ray treatment given for exophthalmic goitre, I first tried the experiment of using human oil. In these cases the attenuated and parchment-like skin of the neck was adherent to the cartilages of the larynx and the trachea. All the subcutaneous tissue of the neck and the infrahyoid muscles had disappeared, and there was absolutely no independent movement of the skin over the trachea and laryngeal cartilages. These patients were in a miserable condition, and had travelled over the Continent and visited numerous clinics in search of relief for their sufferings. As may be imagined, swallowing was difficult and painful, as the skin and the trachea were densely adherent. The only form of treatment appeared to be the introduction of some substance between the adherent skin and the trachea, cricoid, and thyroid cartilages. Excision was out of the question, and x-ray treatment could not cure a condition it had produced. I experimented with various types of oil, including different grades of paraffin, but none of these gave satisfactory results and all were very painful.

Knowing that human fat was fluid at body temperature—for if an incision is made into the abdominal wall one can see the fat globules when some of the fine trabeculae which hold them imprisoned are cut through—some fat from the omentum was removed at laparotomy and investigated, and it gave good results.

Preparation of the Oil

My colleague, Dr. Creed, assisted me greatly in the isolation and sterilization of the human oil. The procedure we adopt is as follows: A portion of omentum is removed from a person who is undergoing an operation such as the removal of the appendix or gall-bladder. The excised portion of omentum is placed in a sterile vessel and taken to Dr. Creed's pathological laboratory. It is thoroughly washed with distilled water to free it as completely as possible from serum and blood, and then placed in a specimen jar half filled with distilled water and plugged with cotton-wool. This is heated to 120° C. in the autoclave for half an hour. After this treatment most of the fat will be found floating free on the surface of the water as a clear yellow oil. While still warm it is pipetted off with a sterile capillary pipette and distributed into sterile 1 c.cm. ampoules. A little is also inoculated into broth culture medium to check its sterility. Each ampoule, after sealing, is placed in a short wide test tube, which is plugged with wool and sterilized in the autoclave. The ampoules are kept in these plugged tubes so that their exterior remains sterile and can be safely handled by the surgeon.

Technique of Treatment

The human oil is liquid at body temperature but is quite solid at temperatures below that, as can be seen in Fig. 1. The tube on the right contains solid human oil, but that on the left has been heated to body temperature and is fluid of a clear amber colour. The oil is put up in 1 c.cm. ampoules, as it is never safe to inject a larger quantity at one time. The ampoule is warmed in water until the oil is slightly above body temperature; the neck of the ampoule is then broken off and the oil drawn up into a warmed 5 c.cm. Record syringe. The reason for using a 5 c.cm. syringe instead of a 2 c.cm. one is that more pressure can be exerted when the injection is given, and this is a most important point. When the oil is in the syringe the scar tissue is carefully cleaned with spirit, and a site is selected just at the outer border of the scar tissue and the syringe insinuated between the adherent bone and the contracted and adherent skin (Fig. 2). The oil is forced in between these two structures, not more than 1 c.cm. being injected at any one place. The scar tissue is actually raised off the adherent bone or cartilage. Several different areas can be injected at one sitting, and the patient does not experience any more pain than is produced when an intramuscular injection is given. About twenty-four hours after the injection the site becomes somewhat red and hot; this condition persists for about twelve to twenty-four hours and then gradually disappears. Injections can be given at fortnightly intervals, and by degrees the adherent scar is made to float upon the underlying structure. In the case of badly adherent scars due to x-ray burns, as many as twenty to twenty-five injections may sometimes be required. It is very important that the injections should not be too frequent and that not more than 1.5 c.cm.

FIG. 1.—Solid human oil in the right-hand ampoule; liquid human oil in the left-hand ampoule.

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be injected in any one area, or the scar tissue will give way and an ulcer will form which may take a long time to heal.

Besides cases where the scar is adherent to bone or cartilage, which are ideal for this form of treatment, there are others in which extensive adhesions have formed between tendons and their tendon sheaths or to skin itself, as on the posterior surface of the hand. In such cases the injection of the oil often results in the free movement of the tendon. Here again it is important that not more than 1 c.cm. of the oil be injected at a sitting

In some cases of healed varicose ulcer of the leg where the skin is densely adherent to the tibia a mobile scar can be obtained by this method.

The advantages of this form of treatment are that the subject can be treated as an out-patient and there is no incapacitation; and it often renders extensive plastic operations unnecessary.

Clinical Memoranda

Acute Volvulus of the Stomach

Since Laewen in 1927 summarized forty known cases of volvulus of the stomach very few additional cases have been recorded. In a review of the literature the aetiological factors in the causation of volvulus of the stomach appear to be: (1) ptosis of the stomach with laxity of its ligaments, causing increase in the normal space beneath the diaphragm, associated with excessive peristalsis; (2) congenital weakness of the left side of the diaphragm. The following case is interesting, because it reveals the possibility of perigastritis as a cause of gastric volvulus.

CASE RECORD

A man aged 25 was admitted into the Anlaby Road Hospital, Hull, complaining of severe pain across the upper abdomen and across the back at the lower dorsal and upper lumbar level. The pain had begun suddenly at 1 p.m. on the day of admission and had persisted with such intensity that by 8 p.m. on the same day he was begging to be put out of his misery. He was a spare man of sallow complexion, with peculiar slit-like eyes and a non-paralytic left external divergent strabismus. He had been born with "bad eyes" and double inguinal hernia, for which he had had two operations. He had not walked until 6 years of age nor cut a tooth until two years later, and because of his backwardness was not accepted as a regular scholar at the council school until 8 years old. On leaving school at 14 he had difficulty in finding employment because of his mental condition. His mother and father are both alive and healthy, and he has three brothers and four sisters, all alive and well.

Clinical Signs.—On examination there was a patch of herpes on his lower lip and a mucous polypus presenting at the right nostril. The upper third of his abdomen was somewhat distended, but the lower two-thirds were quite normal and flaccid. His heart, chest, and central nervous system were also normal. Rectal examination revealed nothing abnormal. His pulse rate was 80, temperature 97°, and respirations 36. He was given morphine $\frac{1}{4}$ grain. The following morning, after a restless night, he still complained of the agonizing pain. His upper abdomen was very much ballooned and now appeared to have definite contour. It bulged from beneath the eighth rib in the left anterior axillary line to the eighth rib in the right nipple line, and descended from these two sites in a parabola to two fingerbreadths below the umbilicus. The patient had not vomited, but had regurgitated whatever fluid he had attempted to take. There were no abnormal physical signs in the chest. The swelling was assumed to be due to a distended stomach. An attempt was made under chloroform anaesthesia to pass a stomach tube, but it was found impossible to get it into the stomach. A differential diagnosis of acute volvulus of the stomach or diaphragmatic herniation of the stomach was discussed, but the latter was ruled out as there were no suggestive signs in the chest. The absence of a provoking cause and of persistent vomiting negatived the suggestion of acute gastric dilatation. It was decided to take the patient into the theatre.

Operation.—The abdomen was opened by a left upper paramedian incision under ether anaesthesia and an enormously distended and cyanosed stomach exposed. Gastrostomy was performed and a catheter inserted into the presenting part,

FIG. 2.—Method of injecting human oil under an adherent scar.

FIG. 3.—Showing an adherent scar on the face.

or the thinned skin will give way; also, at least two weeks should elapse before a second injection is given. Twelve cases of adherent scars at the back of the hand have been treated by this method and have given uniformly good results. It is also valuable in many cases of burns of the face in which the scar is adherent to bone. Fig. 3 shows a child that was terribly burned on the right side of the face, resulting in a long adherent scar the whole length of the mandible on the right side. Twelve small injections of human oil resulted in a mobile scar which is gradually becoming more supple and less distinct.