The low incidence of persistent infections is in agreement with our previous findings in children infected with *T. mentagrophytes* (English and Gibson, 1960), but apparently contrasts with the situation in miners (Gentles and Holmes, 1957). However, the overwhelming number of infections in the pit revisited by these authors were due to *T. rubrum*, a species notorious for persistence. Of the five cases that did recover, four belonged to the minority of men who had been suffering from a *T. mentagrophytes* infection. The miners' infections were probably also more severe and of longer standing than those of the majority of schoolboys.

The infrequency of persistent infections in schoolboys would seem to invalidate the difference in age at which swimming was begun as an explanation of the fall in incidence in school 1 but not in school 2. For if infections acquired while the baths were inadequately cleaned had been quickly cured, the risk of their being passed on would be small. The lax attitude of the boys of school 2 can probably again be invoked in explanation. It is likely that their infections, other than those found by us at the first two surveys, would be treated only after they had existed for some time and had become annoying or severe; meanwhile the disease would have been passed on to others.

Summary

A survey of tinea pedis has been carried out in six local authority senior day-schools in Bristol, five boys' schools and one girls' school, all of which were similarly surveyed two years previously.

In general, little change was noticed in the incidence of lesions, infections, or fungus species, despite the fact that previous visits should have resulted in greater awareness of the condition in both staff and pupils.

However, of the two boys' schools using a swimming-bath in which adequate cleaning had been begun only after the first survey, the incidence in one had dropped significantly from 8.9% to 4.5%, while that in the other had remained at a high level. This is attributed partly to the fact that 35% of boys of the first school had never been to the baths in their poorly cleaned state, compared with 17% in the second; and partly to the fact that "athlete's foot" had become a social stigma in the first school but not in the second.

Out of 53 boys infected at the first survey, 45 were clear at the present one. Persistent infections are not, therefore, a problem in individual boys, though epidemiologically they may well be important.

We are indebted to the head teachers and staffs of the schools for allowing us to visit them for a third time. Our thanks are due to Miss E. H. L. Duncan, of the Central Health Clinic, Bristol, for statistical help; to Mr. G. A. Wills for technical and clerical assistance; and to Dr. R. P. Warin, Dr. C. D. Evans, and Professor R. C. Wofinden for their interest and encouragement.

REFERENCES

- English, Mary P., and Gibson, Mary D. (1959a). *Brit. med. J.*, 1, 1442.
 — (1959b). *Ibid.*, 1, 1446.
 — (1960). *Ibid.*, 1, 1860.
 — and Duncan, Ethel H. L. (1960). *Ibid.*, 2, 573.
 Gentles, J. C., and Holmes, J. G. (1957). *Brit. J. industr. Med.*, 14, 22.
 Marples, Mary J., and Bailey, Margaret J. (1957). *Brit. J. Derm.*, 69, 379.

COMPARISON OF POST-OPERATIVE PAIN AND STIFFNESS AFTER THE USE OF SUXAMETHONIUM AND SUXETHONIUM COMPOUNDS

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Muscular pain and stiffness after the use of short-acting relaxants of the depolarizing variety is a major problem after dental in-patient anaesthesia. A clinical trial has been undertaken to compare the incidence of muscular pain and stiffness after the use of suxamethonium and suxethonium compounds.

Technique

The main investigation was carried out on 100 in-patients. The operative procedures were of the standard in-patient variety—namely, routine oral surgery and plastic operations about the mouth.

Anaesthesia was induced routinely by the intravenous injection of sodium thiopentone in a dose of 150–300 mg. Intubation was facilitated by the use of a short-acting relaxant, after which anaesthesia was maintained by means of nitrous oxide, oxygen, and halothane. The two relaxants chosen for comparison were suxethonium bromide in a dose of 180 mg. and suxamethonium chloride, dose 50 mg.; the use of bromide salts in place of the chloride has been shown to be irrelevant to the incidence of stiffness (Leatherdale, 1959). Each of us used the relaxants alternately on his own lists; both drugs were in the form of the ready-prepared solution.

The patients were admitted for a three-day period. For the first 24 hours after the operation they were confined to bed, after which they were ambulant. The ward sister, who was unaware of the relaxant used, kept a detailed record of pain and stiffness, and on discharge the patients received a form, which subsequently allowed us to follow their symptoms until they abated. From these records the accompanying Table has been compiled.

Summary of Results

Main Trial (100 Patients)	Severe Stiffness or Pain	Mild Stiffness	Total Incidence of all Types of Stiffness
Suxamethonium series (50 patients) ..	13	25	38
Suxethonium .. (50 ..) ..	13	20	33
Total ..	26%	45%	71%
50 female patients	16	28	44 (88%)
50 male	10	16	26 (52%)
Series of Morris and Dunn (1957) ..	22%	50%	72%

Comment.—No significant difference existed in the incidence of pain and stiffness with the two compounds, and the overall incidence agrees well with figures given by Morris and Dunn (1957). Each series of 50 in the main trial comprised 23 male and 27 female patients, and by continuing recording after the initial 100 cases it

was possible to compare the sex incidence with 50 male and 50 female cases. As in previous surveys (Hegarty, 1956; Leatherdale *et al.*, 1959) female patients showed a higher incidence of symptoms.

Character and Duration of Stiffness

The character of the stiffness was not influenced by the relaxant used. The distribution was as follows: neck 59%; abdomen, 33%; chest, 31%; back, 10%; shoulders, 9%.

The onset was normally 12–24 hours after the operation, and only two patients developed symptoms later than 24 hours post-operatively.

In one-third of the patients the pain or stiffness had already recovered by the time they were due for discharge from hospital. In the others it lasted an average of one and a half days after discharge or four days in all. In only three patients did it persist for longer than five days after operation.

On completion of the cases analysed above, recording was continued on a control series, using gallamine as the relaxant for intubation. A further 25 cases were observed and only one case of mild transient stiffness was recorded.

Discussion

Foldes *et al.* (1956) showed that the duration of apnoea after 1.2 mg. of suxethonium per kg. body weight was shorter than that after 0.6 mg. of suxamethonium per kg. In our experience, even a dose of 180 mg. of suxethonium sometimes failed to give a satisfactory relaxation for intubation as 50 mg. of suxamethonium. With this dosage, the difference appeared to be in the intensity rather than duration of the paralysis.

The article by Enderby (1959) appears at first sight to contradict our results. He found a marked reduction of incidence and severity of stiffness after the use of suxethonium. However, the conditions in his series are not comparable to ours in that he used a small dose of suxethonium (50 mg. in his main series) to potentiate the action of decamethonium in patients requiring a hypotensive anaesthetic technique. A comparison of his results with our own suggests that the incidence and severity of stiffness may vary with the dose of relaxant.

Although there is the ever-present danger of a mixed block, a small dose of curare or gallamine given before suxamethonium reduces the incidence of stiffness (Churchill-Davidson, 1954; Morris and Dunn, 1957). These drugs antagonize the action of suxamethonium (Foldes *et al.*, 1957), probably by a competitive blocking action, so that they, too, may reduce post-operative stiffness by lowering the effective dose of depolarizing relaxant acting at the neuromuscular end-plate.

In our series we have endeavoured to include all forms of stiffness, and the symptoms recorded varied greatly from transient myalgia to true pains lasting five days. The incidence reported will depend upon the criteria used in assessment, and this may explain the varied results reported in previous series, representative figures being 36.4% (Leatherdale *et al.*, 1959), 72% (Morris and Dunn, 1957), 25.6% (Hegarty, 1956), 66.7% (Foldes *et al.*, 1956), 0% (Ruddell, 1957). Very rarely did any patient complain of symptoms directly to us, and we believe they were generally regarded by the patient as the usual "aches and pains" expected after an

operation. This factor may elucidate the apparent absence of this complaint in the experience of some anaesthetists, especially after a major abdominal surgical procedure, when the patient may be suffering considerable pain from the site of the operation.

Summary

Suxamethonium chloride was compared with suxethonium bromide in a series of patients undergoing dental operations.

No significant difference in the incidence or character of the post-operative pain or stiffness was recorded.

We thank Dr. Victor Goldman for his help and encouragement in the production of this paper. Special thanks go to Sister J. Simmonds, of the Royal Free Hospital, for her help in recording the patients' symptoms.

REFERENCES

- Churchill-Davidson, H. C. (1954). *Brit. med. J.*, 1, 74.
 Foldes, F. F., Swerdlow, M., Lipschitz, E., Van Hees, G. R., and Shanor, S. P. (1956). *Anesthesiology*, 17, 559.
 — Wnuck, A. L., Hodges, R. J. H., Thesleff, S., and de Beer, E. J. (1957). *Anesth. Anal. Curr. Res.*, 36, No. 5, p. 23.
 Hegarty, P. (1956). *Brit. J. Anaesth.*, 28, 209.
 Leatherdale, R. A. L., Mayhew, R. A. J., and Hayton-Williams, D. S. (1959). *Brit. med. J.*, 1, 904.
 Morris, D. D. B., and Dunn, C. H. (1957). *Ibid.*, 1, 383.
 Ruddell, J. S. (1957). *Ibid.*, 2, 527.

Medical Memoranda

Intraperitoneal Haemorrhage from a Vessel on the Surface of a Uterine Fibroid

Intraperitoneal haemorrhage from a vessel on the surface of a uterine fibroid is a rare complication. Barely 60 cases have been recorded in English literature.

The condition is of importance to the general surgeon as well as to the gynaecologist because the onset is sudden, producing acute abdominal symptoms, which may sometimes be referred to the epigastrium. The recorded pre-operative diagnoses have varied from ruptured ectopic gestation, haemorrhage from an ovarian cyst, twisted ovarian cyst, acute appendicitis, perforated gastric ulcer, intestinal obstruction, acute pancreatitis or ruptured spleen, to torsion of a pedunculated uterine fibroid. Very seldom has the diagnosis been made before laparotomy.

CASE REPORT

A married woman aged 33 experienced sudden severe lower-abdominal pain while sitting watching television. The pain became generalized and was very severe for three-quarters of an hour, but then was less severe unless she moved. Faintness and nausea developed, but no vomiting, shoulder pain, or diarrhoea.

Her last menstrual period had started six days earlier and was normal in amount, lasting four days. She had a regular 28-day cycle and did not think that she was pregnant. She was a para-1, with one miscarriage, and gave a history of occasional attacks of abdominal pain and vomiting for a few months before admission, but of no other illnesses.

On admission to hospital, four hours after the onset of pain, she was very pale and kept feeling faint; temperature 97° F. (36.1° C.), pulse 92, and blood-pressure 95/60 mm.