that the elective migration to the liver is probably not due to a cytotoxic effect of antilymphocyte globulin occurring in vivo after introduction of the lymphocytes coated with A.L.G., but rather to an opsonizing effect involving different mechanisms and the action on the first four components of complement (Gigli and Nelson, 1968).

We thank Dr. J. Dormont for his valuable advice about the choice of A.L.G. and Mrs. M. Brami for technical help. Dr. M. Raynaud, of the Institut Pasteur, Paris, supplied the house antihuman A.L.G.s.

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MEDICAL MEMORANDA

Danger of Skin Burns from Thiomersal

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Thiomersal has been in common use as a preoperative skin preparation for several years in this hospital. A standard solution of 1:1,000 thiomersal in 50% alcohol is used. A case is reported here in which skin burns resulted from the chemical interaction of thiomersal (Merthiolate) and aluminium.

Case Report

On 28 June 1971 preparation was made to perform an abdominal hysterectomy and salpingo-oophorectomy. The patient was placed on a standard rippled surface rubber mattress on the operating table and a paper-backed aluminium foil diathermy electrode 20 by 6 in (51 by 15 cm) was arranged under her buttocks. This was connected to a surgical diathermy set by a genitourinary connector having four press studs fixed through the foil.

The vagina was cleaned with a single application of thiomersal and two applications were made to the abdominal skin to clean the site of the incision.

A normal amount of diathermy was used to coagulate bleeding vessels during the opening of the abdomen. The operation was uneventful.

The next day the patient complained of pain at the buttocks. On examination a blister 2 in (5 cm) in diameter which had burst was found on the right buttock. There was a surrounding area of erythema (see Fig.).

The site of the lesion corresponded to the point of contact of the aluminium diathermy electrode. Because of the possibility of the burn being due to the use of the diathermy the advice of the Department of Health and Social Security was sought.

The design and use of the diathermy were considered to have conformed to accepted practice and electrical burning was not likely to have occurred.

A number of tests were made for chemical interaction between thiomersal and aluminium.

Patch Test.—This was carried out on a safety officer from the Department of Health and Social Security, who volunteered. A 2 in (5 cm) square of six thicknesses of open woven bandage was soaked in thiomersal, placed in the centre of a 3 in (7·5 cm) square of aluminium foil, and fixed to the chest with adhesive plaster. Surgical diathermy was not used. After about five minutes, when the thiomersal had largely evaporated or been absorbed, a series of burning sensations were felt along two of the ½ in (1·3 cm) wide strips where the aluminium was in direct contact with the skin. The centre of the electrode felt warm. More thiomersal was added, and this resulted after a short delay in further sensations of heat burns. After about 20 minutes the reactions died down and the patch was removed. The aluminium foil had largely disappeared, leaving a pink and white powder. Six hours or so later about eight small blisters appeared in an L formation where the aluminium had been in contact with the skin.

Burst blister on buttock surrounded by erythema.

Patch Test for Electrolytic Action.—This test was also performed on the safety officer from the Department of Health. A patch of foil about 2 in (5 cm) square was applied to the skin close to a second patch consisting of a 3 in (7·5 cm) square of bandage soaked in thiomersal with an aluminium electrode 2 in (5 cm) square placed above it which was connected to the first electrode by a microammeter. A current of 4 μA was registered. No lesions were produced.

Chemical Reaction Test.—About 1 ml of thiomersal was poured on to each of three different types of aluminium patient electrode and observed. When the liquid had almost all evaporated chemical action started, and by the time the liquid had completely evaporated a number of pillars of aluminium oxide had formed on the two thicker foils and a loose oxide powder on the thinnest paper-backed foil. (A similar reaction has been observed when thiomersal is allowed to stand in disposable aluminium foil galley-pots used for skin preparation agents).

Heat Generation Test.—(1) A piece of paper-backed aluminium foil 4 by 2 in (10 by 5 cm) was folded into a trough, paper inside, filled with about 0·5 ml of thiomersal, and wrapped around the bulb of a mercury-in-glass thermometer 0-110°C. Outside the foil

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was a wrapping of cotton-wool ¾ in (0·6 cm) thick. A small temperature rise was noted in the first minute, but from the fifth to the eighth minute the rise was rapid—a maximum temperature of 84°C was reached 10 minutes after starting the test. (2) The heat generation test was repeated with Chlorhexidine (Hibitane) in spirit. No temperature rise resulted.

Conclusion and Recommendation

It is believed that the lesion suffered by the patient was a burn produced by heat generated by the action of thiomersal on aluminium. The active ingredient in thiomersal is sodium *o*-(ethylmercurithio)-benzoate, which has a high mercury content. Mercury is known to act as a catalyst and to cause aluminium to oxidize rapidly, with the production of heat. In view of this incompatibility contact between aluminium plate electrodes and thiomersal should be avoided. The manufacturers who supply us with thiomersal have been informed.

I am grateful to Mr. D. N. Menzies for permission to report this case and to Mr. A. K. Dobbie, electrical safety officer, Department of Health and Social Security, for his advice and for allowing me to quote his experimental results.

Rectal Prolapse after Anorectal Dilatation in the Elderly

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Anorectal dilatation is being increasingly used in the treatment of haemorrhoids. Two cases of complete rectal prolapse are reported after this procedure in the elderly.

The use of anal dilatation as a preliminary procedure in haemorrhoidectomy and in the treatment of anal fissure has long been practised. Goligher (1967) and Goligher *et al.* (1969) found on careful follow-up that this was associated with slight faecal soiling in a small number of patients, which was nearly always temporary.

A more thorough dilatation of the anus and lower rectum in the treatment of third-degree haemorrhoids was introduced by Lord (1968). He recommended the breaking down of "pecten bands" by the introduction of three or four fingers of both hands into the anal canal and lower third of the rectum under general anaesthesia. This is followed by the regular use of dilators and sterculia to give a soft bulky stool. Lord (1969) reported occasional mucosal prolapse and soiling postoperatively and treated this by excision of redundant mucosa after crush clamping without late complication.

The present two cases of complete rectal prolapse and incontinence resulted from anorectal dilatation, although in neither case was this carried out simply for the treatment of haemorrhoids.

Case 1

An 85-year-old woman with a two-year history of rectal bleeding presented with recent painful haemorrhoidal prolapse. She had never had any soiling and on rectal examination she had a rather tight anus with a soft tumour palpable within the anal canal. Sigmoidoscopy showed nothing abnormal but proctoscopy showed third-degree haemorrhoids with a villous tumour arising from the left lateral and right posterior haemorrhoids. Gradual anorectal dilatation, eventually inserting four fingers of both hands, was carried out to facilitate subsequent control of the villous tumour and to treat the coincidental haemorrhoids. The left lateral haemorrhoid was then excised together with the tumour as a formal haemorrhoidectomy but the remaining two haemorrhoids were left. The tumour on the right posterior haemorrhoid was excised with the diathermy. A plastic sponge was then temporarily inserted into the anal canal.

Histological examination of the tumour showed a benign villous papilloma without evidence of invasion.

Postoperatively she complained of faecal incontinence on getting out of bed, and on rectal examination it was possible to insert two fingers directly into the rectum without resistance. When the wound had healed she was discharged and was encouraged to carry out perineal exercises.

When re-examined two months postoperatively the anus was well healed without evidence of recurrence but she was found to have complete rectal prolapse with faecal incontinence. A month later a Thiersch wire was inserted, which controlled the symptoms. Adequate follow-up of her rectal tumour, however, was extremely difficult.

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Case 2

A 76-year-old woman with a long history of perianal pain and occasional rectal bleeding presented with recent constipation and ribbon-like stools. On rectal examination she had a tight anus which just admitted the examining finger. Sigmoidoscopy showed nothing abnormal but proctoscopy showed some moderate haemorrhoids.

Gradual anorectal dilatation, eventually inserting four fingers of each hand, was carried out under general anaesthesia and a plastic sponge was then temporarily inserted. Postoperatively she had relief of her pain but complained of continual soiling. On rectal examination the anus was patulous although she was able to grip the examining finger by perineal contraction.

When seen two months later she had developed complete rectal prolapse with faecal incontinence, and three months after anal dilatation a Thiersch wire was inserted. This was unfortunately complicated by episodes of faecal impaction and return of her perianal pain.

Comment

Both these patients probably had some degree of fibrous anal stenosis, unlike a younger patient who would have an element of muscle spasm in addition to any pecten band. After anorectal dilatation for third-degree haemorrhoids it is common for patients to have some soiling and a rather lax anus for several days or even weeks, which then resolves.

Whether or not one believes in fibrous pecten bands as the remediable cause of haemorrhoids, forcible dilatation obviously reduces the ability of the sphincter muscle to contract, partly, at least, by tearing it.

In the elderly the proportion of fibrous to muscle tissue torn by this procedure is presumably greater and thus the danger of permanent incontinence is much higher.

It is strongly recommended in the light of this experience that anorectal dilatation is not used in the elderly or is limited to a much more conservative anal stretch.

I wish to thank Mr. R. V. Fiddian for permission to report these cases and for his advice and encouragement.

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