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TITLE

THE VESICANT PROPERTIES OF HS \(LEVINSTEIN\) FILLED WITH ASBESTOS

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TECHNICAL MINUTE NO. 17

THE VESICANT PROPERTIES OF HS (LEVINSTEIN) FILLED WITH ASBESTOS.

OBJECT AND INTRODUCTION

In an attempt to discover an efficient thickener for mustard, asbestos fibres have been incorporated with HS (Levinstein). The present investigation was designed to determine whether mustard so filled produced lesions comparable with HTV (Alloprene) or H-benzene-rubber gel lesions.

PROCEDURE

HS (U.S.) filled with 10% by weight asbestos (Johnson's Co. Grade 10-6) was compared with HTV 12p, or H-benzene rubber gel through denim and flannel. Asbestos filled mustard was investigated for its ability to penetrate various types and thicknesses of clothing. Six men were used in each trial and the substances were applied as follows, duration of application in each case being 15 minutes.

Due to its physical characteristics, the asbestos filled mustard had to be applied by a small cup-shaped spoon which delivered a drop of approximately 0.096 cc. The substances for comparison were also measured with a similar spoon. In every case, the substance was spread evenly over a marked area - a circle 1 cm. in diameter. In the later trials in the series, a smaller spoon delivering a drop of approximately 0.036 cc. was used. The areas of erythema and vesication in each lesion were calculated from the maximum length and breadth and statistical analyses (Student's test) applied to the results.

RESULTS

The results show that HS (Levinstein) filled with asbestos causes larger areas of erythema and vesication than corresponding amounts of HTV or rubber gel when applied over two or three thicknesses of service clothing (see appendix).

To investigate the vesicant effect of HS (Levinstein) without the asbestos filling, this substance was compared with HTV through two thicknesses of service clothing, exposure being 15 mins., and the amount in each case .096 cc. HS. (unthickened) was shown to have decided vesicant powers of the same order as those of HTV. However, because of the small number of cases investigated, no definite conclusions can be drawn.

DISCUSSION

The lesions produced by the HS (Levinstein) filled with asbestos were in all cases cruciate, an appearance not seen with either the HTV or rubber gel lesions nor indeed with any other type of vesicant lesion. This characteristic shape is well seen in the attached photographs. The reason for the unusual appearance has not been satisfactorily explained, but it will be seen that the experimental rubber gel lesions produced through the clothing used in these trials (see attached plates) tends to be square shaped, which is undoubtedly due to the arrangement of the fibres in the service clothing, as the typical gel lesion on bare skin is circular. The cruciate appearance of the HS asbestos lesion may be due to the same cause - the lower viscosity of the HS resulting in a wider spreading of the vesicant.

In applying the HS asbestos, care was taken to allow the measured volume to rest on the clothing within the marked area (a circle 1 cm. in diameter). It was not pressed in yet it was spread so that it covered as much of the marked area as was possible. Under these conditions, the asbestos had little adhesive properties when the HS was absorbed into the clothing and would have fallen off if the observers had not kept their arms

horizontal. This point is of practical importance because if the particles of asbestos will not adhere to clothing, the severity of the lesion will be much less marked. The matter can only be decided under practical conditions. A field experiment at the gallows is planned to assess the vesicant power of HS (Levinstein) filled with asbestos when charged into 25 pdr. BE/Chem. shell.

CONCLUSIONS

1. H.S. (Levinstein) filled with asbestos has more pronounced vesicant properties than HTV (12 poise) or rubber gel when applied through two or three thicknesses of service clothing.

2. The lesion caused by HS (Levinstein) filled with asbestos, when produced through two or three thicknesses of service clothing is typically cruciate in outline.

3. The conclusions apply to drops of the order of .096 and .036 cc. The conventional drop size (2 mm.) was not used due to the difficulty in measuring such a small amount of asbestos thickened HS.

This paper was prepared by Major W. Somerville, R.A.M.C. and Fl/Lt. H.L. Dobson, R.C.A.F. of the Physiology Section.

Appendix and plates attached.

for (E. Ll. Davies)
Chief Superintendent,
Experimental Station.

WS/SB

APPENDIX

Substances Compared	No. of Cases	Area of erythema of Control in sq. cms.		Area of Erythema of H.S. Asbestos in sq. cms.		P	Signif. of Diff.	Area of Vesication of Control in sq.cm		Area of Vesication of H.S. Asbestos sq. cms.		P	Signif. of Diff.
		Average	Range	Average	Range			Average	Range	Average	Range		
HS Asbestos vs.HTV thro'denim & flannel	6	9.8	12.1-8.3	22.9	33.1-17.8	.01	Signif.	2.3	3.6-0.4	9.1	14.7-6.4	.01	Signif.
HS Asbestos vs. H. Rubber gel thro' 2 thicknesses of cloth	5	23.8	33.1-24.0	38.9	51.2-30.4	.02-.05	Signif.	11.7	15.6-8.8	15.3	25.2-9.0	.02	Signif.
HS Asbestos vs. H. Rubber gel thro' 3 thicknesses of cloth	6	34.9	39.8-27.7	43.4	58.8-36.5	.05	Signif.	14.5	17.6-9.3	20.9	31.2-13.7	.05	Signif.
HS unthickened vs. HTV thro' denim & flannel.	4	11.2	12.0-9.8	16.6	25.8-9.6	.3	Not Signif.	4.8	6.0-3.6	7.8	11.5- 4.3	.3	Not Signif.
HS Asbestos vs.HTV thro' BD serge & flannel.	6	8.9	12.2-6.6	29.2	37.8-12.0	.01	Signif.	2.4	3.6-0.3	10.6	15.8-0.3	.01	Signif.
HS Asbestos vs. H. Rubber gel thro' BD serge and flanrel.	6	19.4	22.3-15.8	36.5	39.0-33.8	.01	Signif.	6.3	10.6-2.2	11.3	18.1-0.03	.05	Signif.

X For basis of calculation of areas of vesication and erythema see Technical Minute #16

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Plate I. 6-B014-281-2

Plates I and II. The cruciate outline of the HS(asbestos) lesion (AS) in constrast with the square outline of the H/Benzene/Rubber Gel lesion (Gel) is shown. These blisters were produced in each case by 0.036 c.c. of the vesicant, applied for 15 min. through B,D. serge and flannel.

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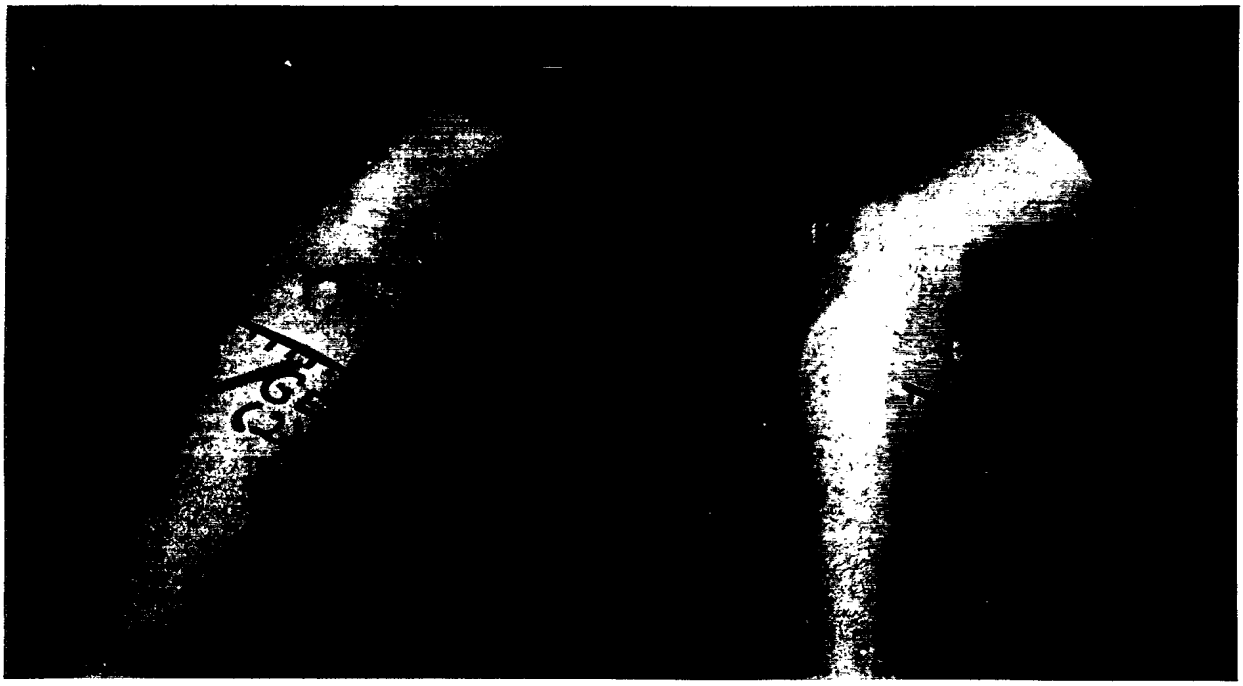

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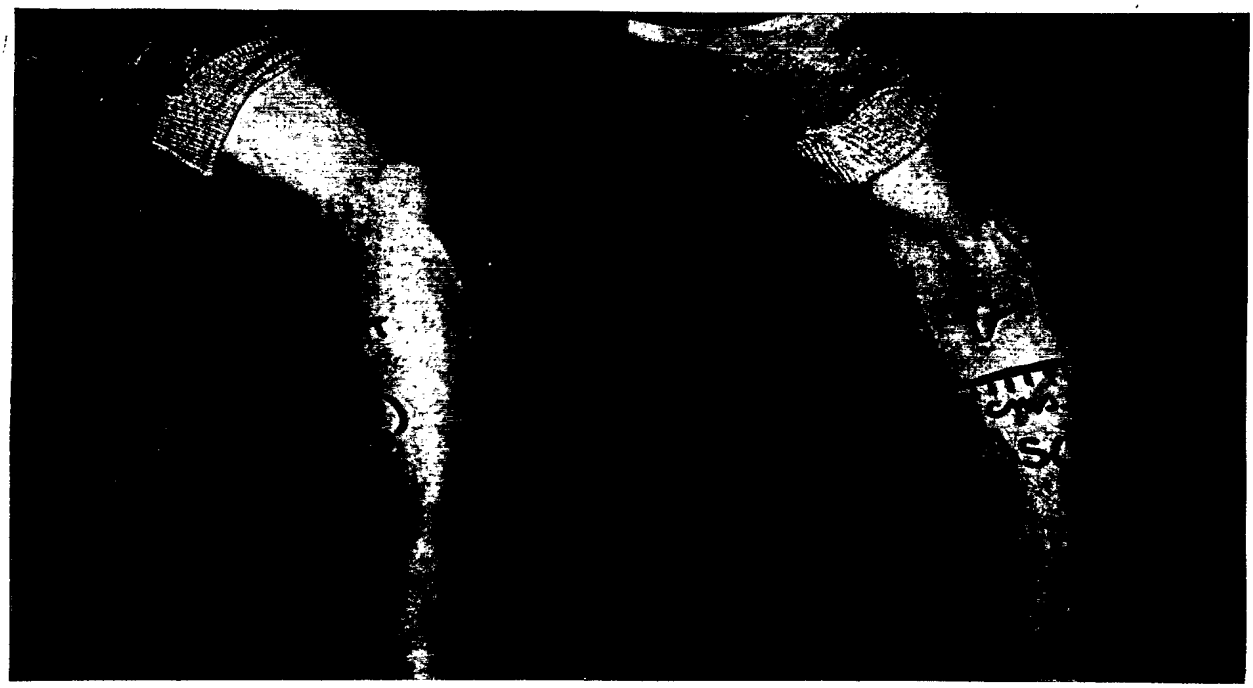

Plate II 6-B-14-281-8

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Plate III 6-B-14-281-7

Plates III and IV : Lesions produced by application for 15 minutes of 0.096 c.c. HS(asbestos) and H/Benzene/Rubber Gel through B.D. serge and two thicknesses of flannel. The HS(asbestos) lesion (AS) are typically cruciate while the H/Benzene/Rubber Gel lesions (Gel) are square in outline.

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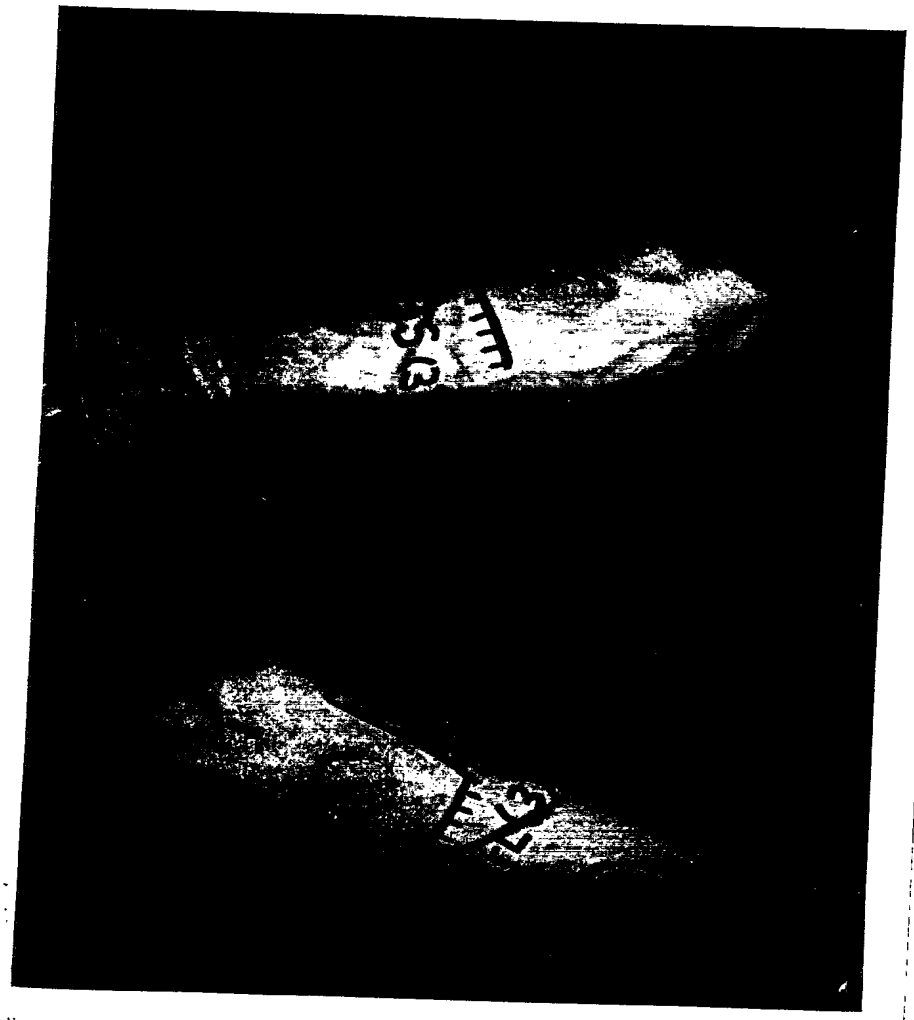

Plate IV

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