acid after operations on the bladder²), and my chief object in writing this paper has been to secure for it, if possible, a more extended trial.

Sodium acid phosphate has the advantage of being very soluble in water and easily administered. It may be given in doses of from 30 to 60 gr. every three hours, but it is better to give smaller quantities oftener so as to secure continuous elimination. A convenient plan is to dissolve 2 drachms in a pint of water and allow the patient to drink small quantities of this from time to time. The only unpleasant effect which I have ever seen it produce has been diarrhoea, but that can be at once checked by suspending the administration and giving a dose or two of chalk mixture.

I should add that sodium acid phosphate will be found a useful adjuvant to urotropin, for the latter, as is well known, acts best in an acid urine.

REFERENCES.

¹ See also *Virchow's Archiv*, 125, p. 566, 1891. ² *Lancet*, November 11th, 1901

CLINICAL OBSERVATIONS ON THE TREATMENT OF INOPERABLE CANCER BY FORMALIN.*

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[ABSTRACT.]

FORMALIN, as commercially known, is a 40 per cent. solution in water of formic aldehyde made by passing a mixture of methyl alcohol vapour and air over heated platinum and conveying it into water. This preparation is a powerful, highly-diffusible, non-toxic antiseptic and deodorant, possessed of escharotic qualities which must be guarded against in using it. It also possesses the property of hardening tissues, and I may here state that I have taken advantage of all its properties except its escharotic quality in attaining the results I propose to describe. I was led to try my present method from my observation, twelve months ago, that formalin 2 per cent. solution had the property of coagulating egg albumen when whole eggs were immersed in it for a few weeks. Thinking over this action of formalin, and knowing its hardening properties on tissues generally, I argued that if I hardened the morbid tissue, if possible without seriously interfering with the healthy tissues, I should convert the growth into a foreign body, and Nature would proceed to dislodge it. My inference has, I venture to say, proved correct.

In from three to seven days after application the cancer mass begins to detach itself in the same way that necrosed tissue separates in gangrene. A line of demarcation is formed at the edge of the malignant mass, and separation takes place in a few days, the time varying with the size and nature of the disease.

Some twenty-four to forty-eight hours after the first application the objectionable foul-smelling discharges cease, thus showing the powerful deodorizing quality of formalin even in 2 per cent. solution. In proportion as the fetid discharges lessen the patient becomes more bright and cheerful. In from twelve to sixteen days I was able to remove the growths in three cases—a sarcoma of the breast, a scirrhus of the breast, and an epithelioma of the lip (recurrent), leaving in its stead healthy granulating tissue, the skin gradually growing and closing the wound up. I have repeatedly reapplied formalin during the healing process without any effect on the granulation tissue left, thus showing that no signs of the original growth remained, for skin will not grow over unhealthy tissue. The process of separating is completed by the aid of a pair of forceps and scissors to snip the fibrous bands that pass into the underlying granulations. It would appear that a fight for supremacy had been going on between the healthy tissue and morbid growth, the former being unable to dislodge its saprophytic enemy until the formalin reduced the greater vitality of the malignant mass, then Nature proved itself superior in the hitherto unequal fight.

The strength of formalin solution should be between $\frac{1}{2}$ per cent. and 2 per cent. If weaker than this the hardening process is not satisfactory, and the application must be continued for a longer period, thus losing time, and the process is extremely painful to the patient. Likewise if 2 per cent. is exceeded the application is painful, the diseased mass becomes surface hardened, separation is difficult, and the risk

of destroying the skin around becomes greater the stronger the solution used, until the escharotic qualities of the formalin manifest themselves.

The method of application is as follows: Absorbent lint soaked in 2 per cent. formalin solution (made by adding 19 parts distilled water to 1 of commercial formalin) and laid on the tumour; this is covered with jaconet and cotton wool and bandaged on. The dressing should be changed six-hourly. After the third or fourth dressing the discharges and fetor ceases; the further process is an aseptic one. In three to seven days the tumour loses its elasticity and becomes darkened, friable, and insensitive—the further use of formalin is painless, and separation takes place as above described. Formalin 2 per cent. solution appears to exert a selective power on morbid tissue, or perhaps it is that the tissue, being more tender by virtue of its younger age and rapid growth, is less resistive to its action than the more mature tissue. It also acts as a powerful stimulant, thus aiding Nature to get rid of its unwelcome parasite. The treatment of the healing surface resolved itself into the ordinary method with alternate boric fomentations or sal alembroth gauze as occasion suggested itself.

Dr. J. D. McFeeley, of Dublin, read a paper at the Surgical Section of the British Medical Association last year on the treatment of rodent ulcers with formalin (published in the *BRITISH MEDICAL JOURNAL* of November 8th). His method and mine are widely different; and I may here state I devised my plan of treatment quite independently, not having seen his published papers till my attention was drawn to it lately. McFeeley avails himself of the escharotic qualities of formalin, which he applies, full strength, under an anaesthetic, either local or general, and keeping his patient under the influence of morphine until the escharotic action is produced; the hardened tissue formed is subsequently allowed to slough off. The disadvantage of his plan of treatment appears to me to be that the whole of the disease may not be attacked (in case of a large sarcoma); the leathery eschar formed takes five or six weeks to slough off, it is therefore not an aseptic process; it is extremely painful to the patient; there is the risk of destroying healthy surrounding skin, in short, the process is similar in all respects to what obtains when chloride of zinc is used.

My method is practically painless to the patient: with it no narcotics are required, and no anaesthetics local or general being necessary. The formalin has time to select other foci should such exist. The whole of the malignant mass is permeated and hardened throughout, and after separation only healthy tissue is left. No sepsis occurs, and the fetid smell is entirely destroyed after a few hours' treatment. The malignant mass is completely removed in sixteen to twenty-four days.

[Several cases were shown illustrating the results obtained by this formalin method.]

GUAIACOL IN THE TREATMENT OF SMALL-POX.

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THE continued prevalence of small-pox in some parts of England prompts me to report the results and treatment of a small number of cases which came under my care last year as medical superintendent of the temporary small-pox hospital erected by the Enfield Urban District Council.

The results may be presented briefly in a tabular form, giving those treated at Enfield and a nearly similar number sent to South Mimms Small-pox Hospital.

Enfield.				South Mimms.			
	Recovered.	Died.	Total.		Recovered.	Died.	Total.
Adults ...	34, 1 unvac.	1, vac.	35	Adults ...	47, 4 unvac.	3, vac.	50
Children	9, 4 unvac.	4, unvac.	13	Children	3, 2 unvac.	1, unvac.	4

The ages of the children treated at Enfield were five under 1 year; one between 1 and 2; three, 3 years; one, 4; one, 7; one, 8; and one, 9. Those that died were 10 months, 4 months, 4 months, and 2 weeks.

* Read before a meeting of the South-Eastern Branch of the British Medical Association.