

The Causes of Painful Injections.

E. MUIR.

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HYDROCARPUS oil and its preparations when injected into the tissues frequently cause a certain amount of irritation followed by swelling and induration and occasionally by the formation of abscesses. When the oil has been prepared from fresh, ripe seeds by cold extraction, this irritation is, as a rule, less or absent altogether.

The oil should be stored in bottles, and should be sterilised by heating to 120° C. for half-an-hour either in an autoclave or an oil bath. This heating should, if possible, be carried out while the oil is still fresh. It is possible that there is a lipase or other ferment in the oil which causes the formation of the irritating substance ; if this is so, the immediate sterilisation of the oil after extraction would destroy the ferment and prevent the formation of this irritant.

In the Philippines the boiling of the oil or esters with 0·5 per cent. metallic iodine until it becomes brown is found to render the oil or esters less irritating but not less effective.

Other causes of painful injections are :—

(a) *Infection of oil when it is too cold and therefore very viscous.*—Such oil instead of filtrating through the tissues is apt to cause a cavity and tearing of the muscles or connective tissue. It is not unlikely that hæmorrhage caused in this way may result in a aseptic abscess formation. Oil when injected should always be of the body temperature or slightly warmer. A convenient way to heat the oil is to heat the syringe by first sucking in oil heated to a temperature of 130° C. and after evacuating this to pour the oil to be injected into the heated barrel of the syringe. The oil is then heated to the required temperature. Care must, of course, be taken that the oil is not too hot.

Hydnocarpus ester or a mixture of equal parts of hydnocarpus oil and esters have the advantage of being less viscous and therefore filtering through the tissues more easily without tearing them. Esters are also for this reason more easily and rapidly absorbed.

(b) *Injecting the oil too rapidly.*—The slower the injection is given the less likely it is to tear the tissues and the more rapidly it is absorbed. The method of dividing the dose into several parts, which may be given in

different directions with only one puncture of the skin, has also this advantage.

- (c) *Injecting into a part which had been inoculated a short time before*, and in which the tissue reaction of the former inoculation is still present. It is well to divide the sites suitable for injection and to take them seriatim so as to avoid this.

We generally find that undistilled esters and sodium salts prepared from painless oil are themselves comparatively painless.