

Hot water as a haemostatic in surgery / by Charles B. Keetley.

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Publication/Creation

[London] : [Practitioner], [1879]

Persistent URL

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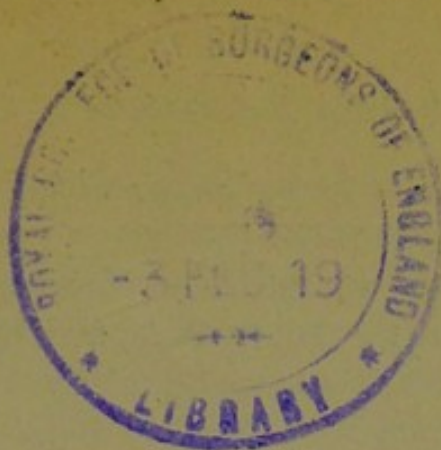
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17.

HOT WATER AS A HÆMOSTATIC IN SURGERY.

BY CHARLES B. KEETLEY, F.R.C.S.,

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THAT hot water is a valuable means of stopping certain cases of hæmorrhage is a fact which I have long observed and frequently turned to practical account. At the same time it is a truth universally known that hot water is a valuable aid to increase the flow of blood after venesection. These statements, though apparently opposed to each other, are unquestionably true.

Having had the good fortune to go to an excellent school where hæmorrhagic noses were not infrequent, I first observed its efficacy in many cases of epistaxis, both traumatic and spontaneous. Afterwards, having read a notice of a paper by an American physician (I have unfortunately and ungratefully forgotten his name), stating the *blanching* power of hot water injections into the vagina, I suggested to Mr. Furneaux Jordan that he should use it as a styptic in operating on recto-vaginal fistula. He did so with entire success in a case treated at the Queen's Hospital, Birmingham, in the autumn of 1875. In February, 1876, I wrote to the *British Medical Journal* a short note on the treatment of epistaxis by hot water, which probably attracted no one's attention.

In 1876, Dr. Windelband recommended injections of hot water in cases of uterine hæmorrhage. Temperature of the water should be from 38° to 39° Reaumur, and in severe cases 41° (= 117° to 120°, in severe cases, 124° Fahr.). See *Medical Times*, August, 1876.

Dr. De Mussy has used Dr. Chapman's hot water bags to the spine for the purpose of checking intra-uterine hæmorrhage.

But the first mention which I can discover of the hæmostatic

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properties of hot water is by Stillé, who, in his *Therapeutics*, recommends it for leech-bites.

On July 3rd, 1878, at the West London Hospital, having amputated a thigh in the upper third, and there being a great deal of oozing from the stump, especially from a quantity of "nævoid" tissue which the knife had divided, I bathed it with cold water for a long time, but without stopping the bleeding. I suddenly drenched the stump with water of a temperature of 120°. All oozing stopped in a few seconds.

In epistaxis, hot water is most effectual when the bleeding comes on during the morning ablution with cold water, or during the progress of a cold in the head. But it answers frequently in cases of traumatic origin. It should be combined with elevation of at least one hand above the head; but the combination is not essential. The water need ~~not~~ ^{only} be poured freely to the face, need not be injected into the nostrils. The head should not be bowed down over the basin more than is necessary. Upon two occasions when I injected hot water into the nostrils I dissolved a large teaspoonful of chlorate of potash in a tumbler of hot water, and injected the solution. The saline was used to prevent swelling of the mucous membrane, which so often follows contact with pure water, especially cold water. This hot saline solution stopped the epistaxis instantly.

I must add, in common fairness, that several friends of mine, as well as myself, have found the hot water powerless against epistaxis of a certain grade of severity, and against hæmorrhage from any but quite small vessels.

I could give other cases in which the effect was less evident; *e.g.*, one of bleeding from a wound in the tongue which, after lasting six hours, stopped two minutes after using hot gargles to the mouth. But in this case, styptics, such as Tinct. Ferri Perchlor., had been applied to the tongue only a short time previously, and their action might have been continuing.

How does hot water check hæmorrhage? In the case of epistaxis I believe it acts almost entirely as a derivative. It relieves congestion of the bleeding mucous membrane. In very hot weather, when the warm local bathing threw the patient into a general perspiration, I have known cold water to succeed where hot failed.

But why the direct application of hot water should blanch mucous membranes and sometimes even the surface of wounds, and yet greatly dilate the vascular system in other cases, is difficult to explain. It is worthy of remark that the hands a few minutes after washing in hot water may often be observed to be paler than before. The last phenomenon is not altogether due to the removal of dirt.

On the whole, the most plausible explanation of the hæmostatic action of hot water is that its heat *when sufficient* acts as an excitant to the nerves of the muscular coats of the smaller vessels, and perhaps directly irritates the muscles themselves.

It has been suggested that, when used against post-partum hæmorrhage, the stimulus acts on nerve-centres situated in the substance of the uterus itself. This action may be direct, or it may be reflex, or it may be both.

Hot water should be used in operative surgery. If it be granted that hot water is as effective as, or more effective than, cold as an anti-hæmorrhagic, then I think it ought to be preferred to cold during surgical operations. Surely there are few persons who, witnessing a large amputation, of the thigh for example, have not shuddered to think of the depressing effect upon the patient's vital powers of spongeful after spongeful of ice-cold water drenched over the wide surface of the flaps and stump. There is no class of operations which have so rapidly advanced in point of safety as the class of abdominal sections, and one of the chief precautions acknowledged to be desirable in that class is that the peritoneum shall be kept warm. When this precaution is neglected, it has been remarked that all the blood in the body becomes gradually lowered in temperature as successive portions flow through the exposed and refrigerated intestinal and mesenteric vessels. How much this must increase the depressant action of a serious operation is clear, and for similar reasons the surgeon ought not to chill a stump.

The whole subject is very interesting, alike from physiological, pathological, and therapeutic points of view, and I trust that the above paper tends to show that it is full of promise.

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