Regarding “Lethal hypothermia – a sometimes elusive diagnosis”

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We read with interest the article by Byard and Bright entitled “Lethal hypothermia – a sometimes elusive diagnosis” [1]. Among other considerations concerning death due to hypothermia, the article summarized major autopsy signs that occur with variable frequency: pink discoloration of the skin over the extensor surfaces of large joints, respiratory and other skeletal muscle hemorrhage, superficial gastric erosions, or Wischnewski spots, vacuolization of renal tubular cells, acute pancreatic inflammation with fat necrosis, fatty change in cells of the heart, liver and kidneys, etc.

However, one of the quite important autopsy signs is missing, described not only in papers [2–5], but also in some of the major forensic medicine textbooks in English, written by German authors [6, 7]. The “inner knee sign” is characterized by hemorrhages of the synovial membrane and bloody discoloration of synovial fluid, and was first described as “innere Kniebefunde” by the German author, Weinke, in 1996 [2]. This sign, when appearing in a non-traumatized knee and in the absence of post mortem putrefaction changes, seems to have a similar diagnostic value to that of frost erythema [3, 4]. The blood supply of the synovial membrane is a vascular system independent of the fibrous membrane of the articular capsule with capillaries that penetrate into the inner cell layers of the synovial intima. Since the regulation of the blood supply depends on temperature, it seems quite probable that the influence of cold might lead to stasis and extravasation of erythrocytes. Thus, the primary observation of the “inner knee sign” is dependent on hypothermia [2–4].

We would also agree with the conclusion by Byard and Bright that the diagnostic criteria and evaluation of hypothermia remains problematic. We would suggest that a comprehensive, well balanced, and controlled “all-inclusive” study of hypothermia be undertaken, that could aid in the development of an algorithm with a sufficient number of different macroscopic and/or microscopic signs which would make diagnosis of hypothermia unquestionable.

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Compliance with ethical standards

Conflict of interest The authors hereby declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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