E32 Revisiting the Question of Yellow Discoloration of the Skull Bones and Diabetes Mellitus in an Autopsy Population

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The goal of this presentation is to illustrate if there is an association between yellow discoloration of the skull bones and diabetes mellitus in the deceased.

This presentation will impact the forensic science community by providing conclusive results that are in line with previous research. The clinical implication for noting a yellow discoloration may guide the physician to order an analysis of insulin and glucose and/or review the patient's history.

This presentation addresses the association between a yellow discoloration of the skull bones and diabetes in the deceased.[1-5] Recognition of diabetes during the autopsy serves to guide the pathologist as to which cases require further toxicological screening to look for glucose and insulin.

The study included 77 autopsy cases, prospectively, at the Unit for Forensic Medicine in Lund, Sweden, during 2016-2017, and the bones of the skulls were evaluated for a yellow discoloration. As a secondary goal, the study evaluated if a possible observed association is confounded by age or sex, or if these characteristics have an isolated effect from that of diabetes mellitus.

The forensic pathologist who evaluated the color of the skull had no background information on the case. Cases with severe decomposition and severely burnt cases were excluded. Discoloration of the skull bones was evaluated by a forensic pathologist using a Chromascop® Shade Guide used in dentistry to evaluate bleaching of the teeth. From this shade guide consisting of 20 shades, two shades were selected, one representing white and one representing yellow.

Information regarding diabetes mellitus in the deceased was obtained either from the police report or patient charts. Diabetes was considered to be present if medication such as oral anti-diabetic medication or insulin was prescribed, or if the diagnosis was mentioned in the police report or in patient journals. Information regarding age at death and sex was collected from the police reports.

Of the 77 cases, 36 (46.8%) were considered to have a yellow discoloration of the skull, and, in total, 11 (14.3%) cases had diabetes mellitus. Of those with a yellow discoloration of the skull, there were n=9 (25%) cases with diabetes, and in those with a normal color of the skull n=2 (4.9%). Using unadjusted logistic regression models, one could observe a conclusive association between a yellow discoloration of the skull bones and diabetes mellitus: *Odds Ratio (OR)*=6.5 (95% Confidence Interval (CI) 1.3, 32.5). The overall sensitivity of a yellow discoloration of the skull bones to detect diabetes mellitus was *9/11*=81%, and the overall specificity *39/66*=59%.

The model was adjusted for sex, and the observed association between a yellow discoloration of the skull and diabetes mellitus remained: *OR*=6.6 (95% CI 1.3, 33.5). The association between a yellow discoloration of the skull bone and diabetes mellitus was still conclusive after having adjusted for age: *OR*=6.8 (95% CI 1.3, 37.2). Age by itself was also conclusively associated with a yellow discoloration of the skull bones: *OR*=4.6 (1.7, 12.8).

In this study, there was a positive association between a yellow discoloration of the skull and diabetes mellitus in a medicolegal autopsy population; however, the study suffers from low statistical power, but the results are still conclusive and in line with previous research; however, the yield of the approach needs to be discussed using the sensitivity (about 80%) and specificity (59%). The test may be useful for identifying cases with diabetes mellitus, but the specificity is low, implying that a large proportion of cases free of diabetes mellitus would not be identified as such. The uncertainty concerning the true association is large, as indicated by the wide CIs.

Reference(s):

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Discoloration, Skull Bones, Diabetes Mellitus