H89 The Influence of Body Mass Index (BMI) in Autoptic Procedures: An Experimental Study in Forensic Cases

Francesco Sicilia, MD, University Magna Graecia of Catanzaro, Catanzaro 88100, ITALY; Matteo A. Sacco, MD, Chair of Legal Medicine, University of Catanzaro, Catanzaro 88100, ITALY; Carmen Scalise, MD, University of Catanzaro, Catanzaro, ITALY; Fabrizio Cordasco, MD, Università Magna Graecia CZ, Catanzaro, ITALY; Fiorella Caputo, MD, University of Catanzaro, Institute of Legal Medicine, Catanzaro 88100, ITALY; Valerio R. Aquila*, Crotone 88900, ITALY; Luigi De Aloe, MD, Institute of Legal Medicine, Catanzaro 88100, ITALY; Pietrantonio Ricci, PhD, University of Catanzaro, Catanzaro, ITALY; Isabella Aquila, MD, PhD*, Institute of Legal Medicine, Catanzaro 88100, ITALY*

Learning Overview: After attending this presentation, attendees will understand the role of BMI in autopsy.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the influence of BMI on the postmortem schedule, on the techniques used, on the technical aspect in qualitative terms, and on the supervision of the operators.

BMI is an easy measurement to diagnose obesity. It is an anthropometric measure. BMI is based on the calculation of a person's weight in kilograms divided by the square of their height in meters. It is not affected by other variables; for this reason, it is currently the weight reference index for the quantitative classification of weight excesses.[1] Its importance is already known in the clinical setting, as a high BMI value is a risk factor for cardiovascular diseases. The influence of BMI in the autopsy timing and in the supervision of the operators has not been evaluated.

Twenty-five decedents who died of natural causes were selected. BMI was calculated before each autopsy dissection. The bi-mastoid cut was used for the head; for the opening of the chest and abdomen the Y-shaped incision was used. The total duration of each autopsy was timed. All autopsies were carried out in the morning, between 7.00 a.m. and noon. The average time to complete an autopsy varies significantly depending on the case to be analyzed; for natural deaths, the average is about four hours. For standardization, the operators remained unchanged at every autopsy. For all the autopsies, a standard protocol was used with removal and dissection of all the organs. Only the heart was retained and preserved in formaldehyde.

In order to evaluate the level of supervision of the first and second operators, the Mackworth clock test was chosen. The test was administered at the beginning and end of each autopsy. The duration of the test was five minutes. The clock test was designed by Mackworth in 1948 at the request of the Royal Air Force (RAF).[2] The test consists of looking at a round clock on which you can see a black hand turning. The subject must press a button each time the hand makes two clicks in a second rather than one. The operator receives a positive feedback (green light) when he/she recognizes the double click and presses the button correctly. In contrast, the operator receives a negative feedback (red light) when he/she cannot recognize the double click of the second hand. In five minutes, the hand performs ten times two clicks in a second.

Results were processed in specific tables. The results showed that the duration of the autopsy was directly proportional to an increase in BMI. Time to complete an autopsy was about three hours with a BMI of 25. In cases with a BMI of 40, the duration was four hours. The analysis of the results on the vigilance test confirmed that the duration of an autopsy correlated negatively with the state of vigilance of the operators. Indeed, with an increasing time to complete an autopsy, there was a decrease in the number of critical stimuli recognized from the clock test. When the autopsy lasted three hours, the operator (the first) on average, made three mistakes. When the autopsy lasted four hours, the operator (the first) on average, made five errors. There was also a negative influence of increasing BMI on the quality of the organ evisceration, in particular with the liver, pancreas, adrenals, uterus, and prostate.

In conclusion, an increasing BMI is directly related to an increase in autopsy duration. Reduction in vigilance is also correlated with the duration of the autopsy. Because a longer autopsy could compromise the quality of the same, the following recommendations are suggested with bodies having a BMI over 35: (1) increase the number of operators to divide the activities to be performed; (2) keep the body at a lower temperature (one to two degrees); and (3) use abdominal decompression techniques by removing the bowel prior to opening the chest and eviscerating the remaining abdominal organs.

Reference(s):

1. Harrison. Principi di medicina interna. XV edizione.
2. Mackworth, N.H. (1948). The breakdown of vigilance during prolonged visual search. Quarterly Journal of Experimental Psychology, vol. 1, pp.6-21.

Forensic Sciences, BMI (Body Mass Index), Mackworth Clock Test