



G40 The Role of *Lepas Sp. Crustacea Cirripedia Pedunculata* in the Evaluation of Postmortem Interval in Aquatic Environments

Francesca Pepe, MD*, Isabella Aquila, MD*, and Silvia Boca, MD, Magna Graecia Univ, Viale Europa, Località Germaneto, Catanzaro, ITALY; Paola A. Magni, MS, Univ di Torino, Via Accademia Albertina 13, Torino, ITALY; Ester De Luca, MD, Debora De Bartolo, Carol Pileggi, MD, Ciro Di Nunzio, PhD, and Pietrantonio Ricci, PhD, Magna Graecia Univ, Viale Europa, Località Germaneto, Catanzaro, ITALY

After attending this presentation, attendees will understand what investigative role water fauna plays in the evaluation of PMI and PMSI in cases where the discovery of corpses is in aquatic environments.

This presentation will impact the forensic science community by demonstrating how product and entomological surveys could give clues on the origin and permanence of an unidentified corpse.

Introduction: The interval between death and the discovery of a body is known as postmortem interval. Backdating the time of death is useful for resolving legal issues when a corpse is recovered. It is particularly useful to: (1) know when the crime was committed; (2) identify the victim; (3) exclude some suspects in the murder case; (4) direct the investigations of law enforcement; and, (5) verify the statements of a suspect. Among the methods used to calculate the PMI include: analysis of consecutive abiotic phenomena (algor mortis, rigor mortis, livor mortis), analysis of ocular changes, analysis of cadaveric fauna (insect larvae, insects, fish, shellfish), and analysis degree of decomposition.¹⁻⁴ In particular, the permanence of a water body causes alterations of both phenomena cadaveric (putrefaction) finds in the exterior and interior of the body. The permanence of the body in water can result in the appearance of cadaverous transformative special phenomena, such as the saponification, with consequent formation of adipocere, and maceration. Of particular interest is the relief of foreign materials and lesions produced in the aquatic environment. These lesions can be produced by the impact of body against rocks and cliffs or into water fauna (vertebrates and invertebrates) and it can cause different types of lesions or sometimes some problems in the distinction of antemortem and postmortem lesions. The wildlife that tends to colonize the corpse in the water allows the evaluation of Postmortem Submergence Interval (PMSI), due to the different timing of colonization of the body by the aquatic fauna and different species of algae found.⁵

The goal of this study was to estimate the time of growth of some types of shellfish to determine the postmortem interval and PMSI. This investigation, in case of naval or air mass disasters, also allows one to determine the possible origin of the body relative to the place where the corpse was found.

Case report: A male subject found on a beach in Central Tyrrhenian of the Southern Italy was analyzed. The external examination showed a corpse in a state of saponification with some areas of maceration from a long stay in the water. For this reason, the external somatic features couldn't be recognized. A survey of clothes was carried out and showed the presence of specific clothing imported from the United States and Italy. Also on the trousers of the victim were crustaceans that were analyzed. In particular, the species found were categorized as belonging to the family of *Lepas sp. (Crustacea: Cirripedia pedunculata)*. The autopsy was completed at the Unidentified Corpse Board (RiSc) for the Ministry of Justice in Italy, then sent to a competent authority. Following the compilation of the board we were contacted by the Police Station of Giglio Island for a possible correspondence with a missing passenger on the Costa Concordia, whose shipwreck occurred on the Ligurian coast January 13, 2012.

The results of autopsy showed the saponification resulted from long permanence in water (three months). An entomological survey was carried out on the time of growth of these crustaceans and the natural habitat of the same was studied. The data obtained was compared and showed an elapsed time from death to the discovery of approximately three months. This time interval was compatible with the Costa Concordia's sinking. For many reasons, the genetic investigation was performed to confirm or reject the hypothesis.

From a scientific point of view, this study is important because it emphasizes the role of marine life in the evaluation of PMI and PMSI, especially in cases of discovery of unidentified bodies in the aquatic environment. This resolves, at times, problems related to the origin of the corpse from the place where it was found or any information on the country of origin where the accident occurred.

References:

1. Bass W. M. (1997) Outdoor Decomposition Rates in Tennessee. In Haglund, W.D, Sorg, M.H. (eds) Forensic Taphonomy, The Postmortem Fate of Human Remains. Boca Raton Florida: CRC Press.
2. Clark, M.A., Worrell, M.B., Pless, J.E. (1997) Postmortem Changes in Soft Tissue. In Haglund, W.D, Sorg, M.H. (eds) Forensic Taphonomy, The Postmortem Fate of Human Remains. Boca Raton Florida: CRC Press.
3. Haglund, W.D, Sorg, M.H. (1997) Forensic Taphonomy, The Postmortem Fate of Human Remains. Boca Raton New York: CRC Press.
4. Buchan, M.J., Anderson, G.S. (2001) Time Since Death: A Review of the Current Status of Methods Used in the Later Postmortem Interval. Canadian Society of Forensic Science. 34(1), pp. 1 – 22.
5. Vanin S, Zancaner S. Post-mortal lesions in freshwater environment. Forensic Science International 2011; 212: e18–e20.

PMI, Aquatic Environments, Forensic Pathology