G31 The Potential Value of Bone Marrow Analysis for Forensic Purposes: Evaluation of Needle Aspiration and Biopsy Taken From the Sternum

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After attending this presentation, attendees will understand the potential contributions of postmortem investigations of bone marrow (BM) taken from sternum in order to validate the diagnosis of some type of death.

This presentation will impact the forensic science community by emphasizing the potential contributions of postmortem BM evaluation that should become a routine procedure, especially if the forensic pathologist can not detect real cause of death during autopsy.

The importance of studying the bone marrow in clinical practice is well known and techniques such as marrow needle biopsies, smears from aspirate, and imprint preparations, allow the diagnosis of several blood disorders. On the other hand, many studies have explored the involvement of bone marrow also in systemic illnesses, including metastatic involvement with tumors, granulamatous diseases, AIDS, in staging of carcinomas, and for the follow-up evaluation of patients undergoing chemotherapy or transplantation. Other studies have strongly suggested that inflammatory cells originating from the BM contribute to sustain pathophysiological processes, e.g., allergy, sepsis, healing wounds. For example, in allergies, progenitor cells migrate to the site of allergic inflammation *via* blood, where they differentiate into tissue-dwelling and classic effector cells, such as mast cells and eosinophils. These modifications are probably secondary to the production of various cytokines which either block or stimulate the proliferation of hematopoietic stem cells (growth factors) and their differentiation.

A number of studies has been published in recent years about the use of BM specimens taken from iliac crest and rib as alternative tissue in forensic toxicology, concerning the detection of postmortem alcohol and drug content. Nevertheless, there is a lack of studies regarding an alternative role of the sternum aspiration and needle biopsy which can help to understand pathophysiological changes in response to stress, infection, or other external stimuli.

A study based on BM samples (needle aspiration and biopsy) taken from the sternum which were obtained from 70 autopsy cases performed in the Section of Legal Medicine, Bari University, from subjects died due several causes (cardiovascular diseases, craniocerebral trauma, sepsis, etc) will be presented. The histopathological results will be discussed in

the light to underline the potential value of BM analysis for forensic purposes.

Assuming that by using sternum evaluation, the limit of poor samples possibly obtained by iliac aspiration, especially in postmortem work-up, might be avoided. Moreover, cytomorphological evaluation on sternum smears might offer more elements than those obtained by just histopatological examination, because of the less frequent postmortem alterations frequently described in bone marrow biopsy. In fact, BM is surrounded by solid cortical bone, which results in mechanical stability, this makes it more secure than other organs, e.g., against postmortem changes. Finally, sampling from sternum can easily be performed in larger amounts, easily accessible in routine autopsies, without changing the structure of the corpse in a relevant way.

The goal of this preliminary study is to demonstrate the presence of bone marrow postmortem activated cells in various causes of death as well as to analyze, for the first time in the literature, the sternum as the most important site for studying cells of such lymphoid organ in cadavers.

Bone Marrow, Postmortem, Immunology

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