G24 Two Cases of Generalized Myxedema

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After attending this presentation, attendees will be able to summarize the clinical manifestations of hypothyroidism, recognize various autopsy findings associated with the hypothyroid state, appropriately utilize ancillary testing to support their diagnosis, and discuss pathophysiologic aberrancies which may lead to death in this type of case.

This presentation will impact the forensic science community by providing education about this medical condition and photographic representation of several autopsy findings, as well as underscore the diagnostic importance of performing a complete medicolegal autopsy with ancillary studies.

Hypothyroidism is rarely diagnosed in the forensic setting. Two cases of hypothyroidism with generalized myxedema were diagnosed at the SWIFS between 2006-2009 and will be discussed in the presentation.

Generalized myxedema is also known as Gull disease, as it was first linked to the hypothyroid state in 1873 by Sir William Gull. The clinical manifestations of hypothyroidism varies with age of onset. Children present with cretinism. Adults; however, suffer from relatively nonspecific manifestations such as generalized fatigue, apathy, and mental sluggishness, slowing of speech and intellectual function. Constipation, decreased sweating, cold intolerance, and weight gain are common. Skin involved by myxedema takes on a thickened and waxy appearance. The skin may become cool and pale due to decreased blood flow and/or an anemic state. Reduced cardiac output contributes to symptomatology of shortness of breath and decreased exercise capacity. The hair often becomes thinned, coarse, and dry-appearing.

There are two forms of myxedema – generalized and pretibial. Generalized myxedema is often seen in persons with hypothyroidism, whereas pretibial myxedema is associated with a hyperthyroid state. Histologic changes are similar in both forms, as the affected skin shows accumulation of matrix substances (glycosaminoglycans and hyaluronic acid), with the separation of collagen bundles in the reticular dermis. In generalized myxedema, matrix accumulation occurs in deeper subcutaneous tissues and visceral sites, therefore involvement of the heart may directly lead to death in some cases.

In cases of generalized myxedema, a thorough scene investigation and medical history should be obtained. In addition, a full medicolegal autopsy to include toxicologic and ancillary serologic analyzes should be performed. Thyroid stimulating hormone (TSH) is the most sensitive screening method for the diagnosis of hypothyroidism, and TSH levels in the serum of both adults and children are reliable up to twenty four hours after death. It is important to note that in cases of secondary or tertiary hypothyroidism (i.e., pituitary or hypothalamic disease), the TSH level will not be increased. Thyroxine (T4) levels will be decreased in all cases of hypothyroidism. Hypothyroidism is easily treatable and carries a low mortality if one is given timely and sufficient hormone therapy.

Although a diagnosis of generalized myxedema is rare in the forensic setting, it is critical for the forensic pathologist to be able to correctly identify this disease. There are many variations and subtle findings which may easily be missed by the uneducated pathologist. One must be able to recognize the various abnormalities at the time of autopsy, critically examine tissue by light microscopy, and select the appropriate serologic studies in order to correctly determine cause of death.

Forensic Pathology, Myxedema, Hypothyroid

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