

H110 Wischnewsky Spots and Black Esophagus in Deaths Involving Diabetic Ketoacidosis: A Case Series

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Learning Overview: After attending this presentation, attendees will better understand the pathogenesis of Wischnewsky spots and acute esophageal necrosis and their usefulness in determining cause of death.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by proposing Diabetic Ketoacidosis (DKA) as an underlying etiology of Wischnewsky spots and acute esophageal necrosis. This will provide increased ability in determining cause of death.

Introduction: Mucosal lesions within the upper gastrointestinal tract at autopsy are relatively rare but can be important in determining an underlying cause of death. Two such lesions are Acute Esophageal Necrosis (AEN), also called “black esophagus,” and Wischnewsky spots of the gastric mucosa. This report details three cases where DKA was a primary or contributing cause of death. Black esophagus and Wischnewsky spots presented concurrently in all three cases.

Case Reports: Case 1 involves a 48-year-old female who collapsed on her bathroom floor. Toxic effect of methamphetamine was found to be the primary cause of death, and DKA was found to be a contributing factor. This death was complicated by hypertensive and atherosclerotic cardiovascular disease. There was no evidence of possible hypothermia.

Case 2 involves a 51-year-old jail inmate who was found unresponsive in his cell and was determined to have died of acute pyelonephritis. Similar to Case 1, the decedent had elevated levels of vitreous glucose and acetone consistent with DKA, as well as hypertensive and atherosclerotic cardiovascular disease. There was no evidence of possible hypothermia.

Case 3 involves a 51-year-old male who was determined to have died of DKA, with methamphetamine and fentanyl use being contributing factors. Uncontrolled diabetes mellitus had led to recent amputation of the great toe. The decedent was found outdoors so interpretation of the pathological findings was complicated by possible hypothermia.

Discussion: AEN involves mucosal necrosis of the esophagus, a finding that has been reported in few case studies that have mainly centered around alcohol abuse and diabetes mellitus but have been as far reaching as hypothermia and Steven’s Johnson syndrome. AEN is thought to be an initial ischemic process with further damage being caused by reflux of gastric contents.¹ Wischnewsky spots are lesions of the gastric mucosa that are classically thought to be associated with fatal hypothermia, with different studies reporting a range of 40%–91% incidence in cases where hypothermia was a contributing cause of death.² Despite being considered pathognomonic for hypothermia, Wischnewsky spots have also been seen in conjunction with DKA.³ Histologically, Wischnewsky spots are characterized by autolysis of erythrocytes and capillary dilatation.² In this series, AEN and Wischnewsky spots are presented concurrently with DKA in all cases, suggesting a possible common or connected etiology, especially when considering previously reported simultaneous presentation in hypothermia. Thermogenic dysregulation and ischemia in DKA are explored as possible pathologic mechanisms.

Reference(s):

1. Yosef S. Haviv, Constantin Reinus, and Joseph Zimmerman. “Black Esophagus”: A Rare Complication of Shock. *Am J Gastroenterol* 91 (1996): 2432–35.
2. Michael Tsokos et al. Histological and Immunohistochemical Study of Wischnewsky Spots in Fatal Hypothermia. *American Journal of Forensic Medicine and Pathology*, 2006.
3. Kenneth Howard Clark and Robert Stoppacher. Gastric Mucosal Petechial Hemorrhages (Wischnewsky Lesions), Hypothermia, and Diabetic Ketoacidosis. *American Journal of Forensic Medicine and Pathology*, 2016.

Diabetic Ketoacidosis, Esophageal Necrosis, Wischnewsky Spots