



E32 Meningitis as a Cause of Death in a Medical Examiners Setting

Breanna M. Cuchara, MFS*, Manassas, VA 20110; Ariel C. Viramontes, MD*, MedStar Georgetown University Hospital, Washington, DC 20007; Francisco J. Diaz, MD, Office of the Chief Medical Examiner, Washington, DC 20024

Learning Overview: After attending this presentation, attendees will understand the risk factors within the District of Columbia (DC) and the causes of fatal meningitis cases. This study will explore medical and social histories of each case.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by encouraging other medical examiner's offices to investigate the causes and specific risk factors of meningitis cases that occur in their jurisdictions. This is of great importance to decrease the likelihood of fatalities among patients diagnosed with bacterial or other forms of meningitis.

Meningitis is the inflammation of the meninges surrounding the brain and spinal cord.¹ The etiology of meningitis can be divided into bacterial, viral, parasitic, fungal, and non-infectious types. Each type can be caused by reasons such as injury, illness, substances, or chemicals. Viral meningitis is the most common form in the United States.¹ It is not as fatal as bacterial meningitis and has no specific treatment. It can be spread through bodily fluids, such as coughing, kissing, etc. Bacterial meningitis is primarily caused by a few different species of bacteria. It can be fatal and/or lead to brain damage. The population who is most at risk are patients with weakened immune systems and/or living in a college dorm or group home, where the exposure is high.

According to the Centers for Disease Control and Prevention (CDC), in the United States between 2003 and 2007 there were approximately 4,100 cases and 500 deaths due to bacterial meningitis each year.² Meningitis caused by the bacteria *Neisseria meningitidis* can be prevented with the MenB and MenACWY vaccines.³ However, vaccine ignorance (lack of awareness about the vaccines) and vaccine hesitancy are on the rise. In fact, the World Health Organization cites vaccine hesitancy as one of the top ten threats to public health.³

This study analyzed autopsy, laboratory analysis, and investigative reports for significant medical history, signs/symptoms, residencies, and social history. This study looked over DC Office of the Chief Medical Examiner (OCME) cases over the past ten years (2008–2018). Overall, there were 22 cases of meningitis in DC. It was found that 55% were male and 45% were female. Decedents in this study were 68% Black, 22% White, and 9% Hispanic. The average age was 43 years old (the youngest was ~18 days old and the oldest was 70 years of age). It was found that bacterial meningitis was the most common cause of death in this study (91%), followed by viral (5%) and non-infectious meningitis (5%).

Interestingly, the 12 DC residents in this study were from every ward, averaging one to two decedents per ward. It was also discovered that decedents either had no medical history documented (22%), a history of strokes (27%), skull fractures/trauma (13%), and hypertension (27%). It was also found that 41% had a history of ethanol and crack cocaine abuse (22%) and used tobacco (27%). This is interesting because Phencyclidine (PCP) is one of the most abused drugs in DC, but was not present in any of these cases.

This research will provide statistical data for public health officials regarding the risk factors for meningitis. Given the amount of people that reside in the DC and the drug addiction rate, the risk of potential exposure is possible. This study shows that although some citizens in different wards have little to no access to major hospitals, this disease crosses all socioeconomic statuses. This study provides evidence of how important it is for medical examiner's offices to search for immunization records for each meningitis case, if accessible. Vaccines are available now and continuing education about these vaccines and meningitis could decrease the number of deaths per year.

Reference(s):

1. Understanding meningitis. *Meningitis Foundation of America*. 2017 Sep.
2. Thigpen M.C., Whitney C.G., Messonnier N.E., Zell E.R., Stat M., Lynfield R., Hadler J.L., et al. Bacterial meningitis in the United States, 1998-2007. *N Engl J Med*. Infections Programs Network.
3. Meningococcal meningitis. *World Health Organization*. 2019 Feb.

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