G32 Blunt Injury vs. Natural Death: A Case of Coronary Arterial Thromboembolism Originating From Mechanical Aortic Valve

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After attending this presentation, attendees will: (1) recognize and assess severity of blunt force head injury; (2) realize the importance of careful review of known clinical details; (3) anticipate and recognize complications of mechanical aortic prosthetic valve; and, (4) be able to identify thromboemboli in major coronary arteries.

This presentation will impact the forensic science community by explaining that blunt injury is one of the most common causes of death in forensic routine work. However, some decedents have coexistence of blunt injuries and severe natural disease. Carefully checking the medical history and performing full autopsy can avoid mistakenly overestimating blunt injury in the cause of death.

The decedent was a 26-year-old G1P1 nursing student at 26 weeks gestation with a high-risk pregnancy. Her medical history is significant for congenital Ventricular Septal Defect (VSD), bicuspid aortic valve, and mild coarctation of the aorta. She underwent VSD repair when she was 8-months-old in 1988. In 1996, she was diagnosed with Discrete Subaortic Stenosis (DSAS) and had surgical removal of a subaortic membrane. As the function of her aortic valve deteriorated, she had a homograft aortic valve replacement in 1999, which was followed by mechanical aortic valve replacement (St. Jude/Gortex®) in 2006. She was changed from warfarin thromboprophylaxis to subcutaneous low molecular weight heparin for her mechanical aortic valve due to pregnancy.

On the morning of July 5, 2013, she awoke up with numbness in her left arm. She then experienced dizziness, tightness of the chest, and tingling in her arms, followed by stool incontinence once out of bed. At 9:20 a.m., she fell down 15 stair steps on her way to the bathroom. 911 was called and the Emergency Medical Services (EMS) team arrived. She was found conscious, alert, and oriented x3. Upon transfer to the gurney, she suddenly lost consciousness and presented with slow breathing and tachycardia (160bpm). Her transportation was unexpectedly slow due to construction and she was unresponsive upon arrival at the Emergency Room (ER). An Emergent C-section was performed at 10:40 a.m.; however, the mother was pronounced dead at 10:55 a.m. The baby was alive at birth but died one day later secondary to birth asphyxia.

The autopsy revealed minimal blunt force injuries. The skin above and lateral to the right palpebral fissure showed a slightly raised purple/blue abraded contusion measuring 1¼ x 1 inch with a ¼ inch slightly patterned abrasion within the contusion. Petechiae of both the upper eyelids as well as an oval $^{3}/_{8}$ inch horizontal purple/red contusion of the right upper eyelid were noted. However, no evidence of epidural or subdural hematoma was noted. Sections through the cerebral hemispheres, brainstem, and cerebellum revealed small, rare, periventricular, rubbery, clear-tan plaques measuring 0.6cm. The uncinate gyri and cerebellar tonsils did not demonstrate pressure phenomena. In summary, there was minor trauma of the right orbit, but it was insignificant to cause death.

The dissection of the heart showed a bileaflet St. Jude-type prosthetic aortic valve. A flap-like tan, granular, flat, soft white thrombus measuring 1.5 x 0.6cm was on the inferior surface of the anterior medial leaflet and partially obstructing it. The left anterior descending coronary artery and right coronary artery were patent. However, the mid portion of the circumflex coronary artery was distended and completely blocked by embolic white thrombus. Previous mild post ductal coarctation and surgical closed and healed perimembranous VSD were also demonstrated.

Therefore, the cause of death was determined to be sudden thromboembolic occlusion of mid left circumflex coronary artery secondary to thrombus formation on a mechanical aortic valve prosthesis. The traumatic injuries were incidental, complicating transient cardiac syncope.

Coronary Thromboembolism, Blunt Injury, Prosthetic Valve

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