



## Pathology/Biology Section - 2014

### **G26 Commode Cardia — Death by Valsalva Maneuver: A Case Series**

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The goal of this presentation is to report the incidence of decedents who died on the toilet following the Valsalva maneuver during the process of defecation (also known as “Commode Cardia”) in order to better understand the impact and importance of this phenomenon.

This presentation will impact the forensic science community by reviewing the possible pathophysiology of Commode Cardia, providing information regarding the incidence of Valsalva maneuver and cardiovascular disease, and stratifying the importance of the Valsalva maneuver as a minor risk factor for sudden cardiac death in the presence of underlying arteriosclerotic cardiovascular disease.

It is well documented that vagal stimulation causes cardiovascular changes through autonomic stimulation. Various techniques that induce vagal stimulation have been identified and are called vagal maneuvers. In the clinical medical setting, these maneuvers are routinely applied for therapeutic or diagnostic reasons to utilize known specific cardiovascular changes. However, some of these vagal maneuvers may be involuntarily used during normal daily activity and lead to unintended and severe cardiac consequences. One example of this is the Valsalva maneuver during the act of defecation.

The Valsalva maneuver is divided into four phases. In phases I and II, there is increased intrathoracic pressure that reduces the amount of blood flowing into the thoracic cavity, especially in the vena cava, aorta, and cardiac chambers. A small but significant decrease in the coronary flow velocity also occurs in phase I. For these reasons, the clinical application of the Valsalva maneuver may be contraindicated in a variety of cardiovascular conditions, including hypertrophic obstructive cardiomyopathy, significant aortic valvular disease, recent myocardial infarction, and aortic stenosis. However, individuals with these cardiovascular conditions who involuntarily Valsalva during evacuation of the colon could potentially suffer adverse events such as a syncopal episode through decreased cerebral blood flow and cerebral perfusion, sinus pause, atrioventricular block, arrhythmia, or myocardial infarct from decreased flow through coronary arteries. Thus, the Valsalva maneuver can be potentially fatal, a chain of events that can be described as “Commode Cardia.” Although this phenomenon has been well documented, little is known about the incidence of this particular pathophysiologic event.

In 2012, the Wayne County Medical Examiner’s Office in Detroit, Michigan, investigated 127 deaths located in the bathroom. Twenty people died on the toilet: 13 of cardiac disease following a Valsalva maneuver (natural); 4 from drug intoxication (accident); 1 from incised wounds to the wrist (suicide); 1 from a gunshot wound to the head (suicide); and 1 from smoke and soot inhalation (accident). In another 32 cases, the possibility that the decedent used the toilet just prior to having the fatal cardiac event could not be ruled out. During that same period, the office signed out a total of 608 cases of hypertensive and arteriosclerotic cardiovascular disease and arteriosclerotic cardiovascular disease. Based on this data, the incidence of Valsalva maneuver immediately preceding a terminal cardiac event, or Commode Cardia, is between 2.14% and 7.4% in our patient population. This study clearly indicates that the Valsalva maneuver is a small but significant risk factor for sudden cardiac death in the presence of underlying arteriosclerotic cardiovascular disease.

### **Commode Cardia, Valsalva Maneuver, Cardiovascular Disease**