

## Volumetric overload shocks in the Patho-etiology of the transurethral resection prostatectomy syndrome and acute dilution Hyponatraemia

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### Abstract

**Hypothesis:** The transurethral resection of the prostate (TURP) syndrome is defined as severe vascular hypotension reaction that complicates endoscopic surgery as a result of massive irrigating fluid absorption causing severe acute dilution hyponatraemia (HN) of <120 mmol/l. The vascular shock is usually mistaken for one of the recognized shocks and Volumetric Overload Shock (VOS) type 1 (VOS1) is overlooked.

**Objective:** To report VOS and its successful treatment of hyper-tonic sodium therapy (HST) that is lifesaving. To report that Starling's law is wrong and the correct replacement is the hydrodynamic of the porous orifice (G) tube.

**Methods:** We conducted the following studies:

1. Prospective study on 100 consecutive TURP patients among whom 10 developed the TURP syndrome with acute dilution HN and vascular shock.
2. A case series of 23 TURP syndrome cases.
3. A physics study on the hydrodynamic of the G tube.

**Results:** The TURP syndrome is defined as severe vascular hypotension reaction that complicates endoscopic surgery as a result of massive irrigating fluid absorption causing severe acute dilution HN of <120 mmol/l. The vascular shock is usually mistaken for one of the recognized shocks and Volumetric Overload Shock type 1 (VOS1) is overlooked making Volumetric Overload Shock Type 2 (VOS2) unrecognizable. In adults VOS1 is induced by the infusion of 3.5-5 liters (Figure 1) of sodium-free fluids and is known as TURP syndrome or HN shock. VOS2 is induced by 12-14 liters of sodium-based fluids and is known as the adult respiratory distress syndrome. The most effective treatment for VOS1 and VOS2 is HST of 5%NaCl and/or 8.4%NaCo3. The literature on TURP syndrome is reviewed and the underlying

patho-etiology is discussed. Starling's law proved wrong and the correct replacement is the hydrodynamic of the G tube.

**Conclusion:** Volumetric overload causes shock of two types, VOS1 and VOS2. VOS 1 is characterized with acute dilution HN and is known as the TURP syndrome. Mistaking VOS1 for a recognized shock and treating it with vascular expansion is lethal while HST is life-saving. Starling's law which dictates the faulty rules on fluid therapy proved wrong and the correct replacement is the hydrodynamic of the G tube.