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# A rare case report of a patient undergoing CABG with hydrocephalus.

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ΓΕΝΙΚΟ ΝΟΣΟΚΟΜΕΙΟ ΑΘΗΝΩΝ  
**Ο ΕΥΑΓΓΕΛΙΣΜΟΣ**

## **Introduction**

- Hydrocephalus perioperatively in cardiac surgery patients is a very rare entity. We present a case report of a patient undergoing CABG with hydrocephalus of normal pressure (NPH). With this case report we aim to present the perioperative considerations for prevention of neurological complications and a literature review of these patients.

## **NPH epidemiology**

- Prevalence of hydrocephalus is estimated 85 per 100,000 individuals with significant difference in different age groups; 88 per 100,000 for the pediatric population and 11 per 100,000 in adults [1].
- The prevalence in the elderly population is much higher, somewhere around 175 per 100,000, and more than 400 per 100,000 in octogenarians due to the high incidence of NPH later in life [1].
- Five percent of patients undergoing cardiac surgery have reported a stroke postoperatively. The majority of perioperative strokes are embolic, either from crossclamping of the aorta or from excision of heavily calcified valves. Infratentorial strokes are the least frequent. After stroke in the posterior fossa, obstructive hydrocephalus develops in 10% to 25%. This may be due to infarction or hemorrhage. Consequently, edema leads to herniation and obstructive hydrocephalus, which is a life-threatening complication [2].

## **Pathophysiology**

- The obligation for taking special care in patients with NPH during cardiac surgery surely may be questioned. In NPH, disturbed cerebrospinal fluid (CSF) circulation in the form of increased production and insufficient CSF absorption through arachnoid granulations is one of the major hypotheses regarding the pathophysiology. In contrast to the major part of the hydrocephalus subtypes, intracranial pressure is considered to be normal, such that normal pressure of the subarachnoid distance is a criterion for the diagnosis of probable iNPH [3].

## **Clinical scenario**

- A 77-year-old patient with coronary artery disease and history of NPH (due to toxoplasmosis) underwent CABG under CPB. His medical history included depression, arterial hypertension and three-vessel coronary artery disease with rEF (40%). Three coronary artery bypass grafts were performed (LIMA-LAD, SVG-RCA, SVG-OM1). Bypass and crossclamp times were 65 and 40 minutes, respectively. During CPB mannitol and hydrocortisone were administered and strict monitoring of pCO<sub>2</sub>, pO<sub>2</sub>, invos and arterial blood pressure was implemented. Deairing was performed before removal of the aortic crossclamp. The patient was transferred to the recovery unit and extubated the same day. He presented no neurological complications.

# Comments and Literature review

- Preoperative considerations concern anesthetic, perfusion, and pharmacologic management. Use of intravenous anesthesia instead of inhalational, administration of mannitol and hydrocortisone, careful monitoring of blood pressure, pO<sub>2</sub> and pCO<sub>2</sub> and positioning of the patient and slow rewarming are measures to keep intracranial pressure low.
- Few cases are described in the literature. Most of them concern NPH as a postoperative complication. Case reports in the literature describe obstructive hydrocephalus as a result of a cardiac surgery (aortic valve replacement) procedure complicated with hemorrhagic cerebellar stroke [2,5]. A unique report exist of a patient with NPH who deteriorated after cardiac surgery, and presented a significant recovery of the symptoms after a shunt placement (Diniz et al) [4]. Laviv et al, finally, described a case series of acute presentation of NPH after transcatheter aortic valve implantation (TAVI) [6]. When subtle fluctuations in levels of consciousness are present, indications for a neurologic evaluation and investigations after cardiopulmonary bypass are much stronger. Cerebral CT is of paramount importance in the diagnosis of hydrocephalus and indicates that early appropriate intervention can lead to a complete recovery [2]. These cases illustrate an unusual manifestation of a relatively common complication of cardiac surgery.
- Hydrocephalus is becoming more and more frequent after cardiac surgery because of the ageing population. Consideration should be taken of this rare and risky entity. Future studies are warranted to shed light on risks and management of perioperative hydrocephalus.

## **Bibliography**

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