Vicarious excretion of intravenous contrast medium in the gallbladder of a renal trauma patient

Clinical History:

The patient was admitted in the emergency department after blunt trauma in the left renal region. The patient complained about pain in this region. Apart from skin bruises, the rest of the clinical examination was unremarkable.

Imaging Findings:

On admission, the patient underwent contrast enhanced CT of the abdomen which revealed a small rupture of the left renal cortex, situated in the posterior surface of the kidney. This rupture had caused a large retroperitoneal haematoma (mainly in the left posterior pararenal space) and perirenal haematoma which in turn pushed the kidney anteriorly. There was also a small extravasation of the contrast medium in the left perirenal space. The excretion of the contrast medium was normal in both kidneys. (Fig. 1, 2)

The day after admission (15 hours later), the patient underwent a second abdominal CT where no remarkable change was observed. Of note was the fact that the gallbladder was opacified by a dense material which did not exist in the previous day’s scan. (Fig. 3)

Discussion:

The term “vicarious excretion” of a contrast medium (VECM) refers to the excretion of the contrast medium from a route other than the normally expected. In general, intravenous contrast media are mainly excreted by the renal glomeruli. However, 1.5%-2% of dose can be excreted by alternative routes including biliary tract, gastrointestinal tract and glandular epithelium. [1] One common example is that of an intravenously administered contrast medium being excreted by the gallbladder. This type of excretion can occur with normal renal function and large doses of contrast agents or with impaired renal function or obstruction. For example, there are reports about iodinated contrast media being excreted by the small and large intestine in trauma patients with low blood pressure due to renal vascular pedicle injury. Other reports involve trauma patients with retroperitoneal haematomas where the i.v. contrast medium was excreted by the gallbladder. [1, 2, 3] One possible mechanism that could account for this phenomenon is the sustained decrease in blood pressure which in turn decreases renal function and hinders the excretion of contrast medium. Consequently, the contrast medium is excreted by different organs like the gallbladder. [4]

In a published case series, such a type of vicarious excretion occurred both in patients with unilateral renal
pathology and in patients with normally functioning kidneys. The time for the visualization of the contrast medium in
the gallbladder varied from 20 minutes to 72 hours. It is possible that newer contrast agents are less excreted by the
biliary tract because they bind less to proteins. [5] Another case series of patients with unilateral ureteral obstruction
who underwent intravenous urography showed that vicarious contrast media excretion in the gallbladder may
happen in 42% of patients. [6] Another kind of VECM involves the excretion of per rectum administered gastrografin by the kidneys. As this
phenomenon is only rarely expected, it can be falsely considered to represent recto-vesical fistula, thus delaying the
patient's management. This phenomenon is caused by the fact that roughly 3% of the orally ingested ionic agents is
absorbed by the gastrointestinal tract into the portal vein through both a paracellular and a transcellular route. After
its absorption, the contrast medium will be normally excreted by the kidneys but can sometimes cause adverse
reactions. Increased absorption of oral contrast medium by the gastrointestinal tract may also occur in patients with
diseases like enteric ischaemia, inflammatory bowel disease, gastroenteritis, diverticulitis or bowel obstruction. [7, 8]

**Differential Diagnosis List:** Vicarious excretion of intravenous contrast medium by the gallbladder., Vicarious
excretion of contrast medium, Milk of calcium bile, Porcelain gallbladder

**Final Diagnosis:** Vicarious excretion of intravenous contrast medium by the gallbladder.

**References:**

Kim SR, Sant GR, Heaney JA. (1987) Vicarious Excretion of Urographic Contrast in a Multiple Trauma Patient.
Int75(4):446.
Lang EK, Rudman E, Hanano A, Brodsky J, Macchia RJ. (2009) Delayed interstitial renal contrast extravasation and
Dyer RB, Gilpin JW, Zagoria RJ, Chen MY, Case LD. (1990) Vicarious contrast material excretion in patients with
Low VHS, Chu BK. (2006) Diagnostic error due to vicarious excretion of rectal iodinated contrast. Australas
Description: This contrast enhanced CT was performed on admission. We can see a large left perirenal and posterior pararenal haematoma which displaces the left kidney anteriorly. Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.
Description: Sagittal plane of the first CT examination showing the perirenal and pararenal haematoma pushing the kidney anteriorly. There is also evidence of extravasation of small quantity of contrast agent. Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.
Description: Coronal plane of the first CT examination showing the haematomas which displace the kidney. Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.
Description: This 5-minute delayed CT image proves that the gallbladder was normal and empty on admission. Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.
Description: 15 hours post admission abdominal CT demonstrated opacification of the gallbladder by a dense material. The opacification of the renal calyces is caused by the contrast medium of the second examination (presented here). Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.
Description: Coronal MPR reconstruction image of the second CT examination showing the opacified gallbladder. Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.

Description: Oblique MPR reconstruction image of the second CT examination showing the opacified gallbladder. Origin: Department of Radiology, General Hospital of Katerini, Katerini, Greece.