Case Report

Milk of calcium in the inferior calyx of a hydronephrotic kidney in a tetraplegic patient – a diagnosis to be made before scheduling for extracorporeal shock wave lithotripsy

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Study design: A Case Report of renal milk of calcium in a tetraplegic subject.

Objectives: To increase the awareness of renal milk of calcium in spinal cord injury (SCI) physicians. Renal milk of calcium contains a colloidal suspension of calcium crystals. Since upright views of the kidneys are not performed in tetraplegic subjects, the renal milk of calcium may be misinterpreted as renal lithiasis by routine radiography taken in supine position.

Setting: Regional Spinal Injuries Centre, Southport, England.

Method: In a 41-year-old male with traumatic tetraplegia, X-ray of abdomen in supine position showed multiple opacities in the region of the left kidney. These radio opaque shadows were interpreted as renal calculi. Subsequently, computed tomography (CT) of the kidneys was performed.

Results: CT confirmed the presence of calculi in the mid-polar calyx. However, the density situated in the inferior calyx of the hydronephrotic left kidney exhibited a horizontal upper edge. This specific radiological finding as observed in the CT of kidneys, provided the clue to the presence of milk of calcium in the inferior calyx of the hydronephrotic left kidney.

Conclusion: As plain film of the abdomen in standing position is not performed in SCI patients, physicians caring for SCI patients should have a high index of suspicion for renal milk of calcium. Prompt diagnosis of renal milk of calcium will help to avoid unnecessary surgery, or extracorporeal shock wave lithotripsy.

Spinal Cord (2000) **38**, 325–326

Keywords: milk of calcium; spinal cord injury; ESWL; kidney - calculi

Introduction

Renal milk of calcium contains a colloidal suspension of calcium crystals. This rare condition may be misinterpreted as renal lithiasis by a routine radiography performed in supine position.

A search in Medline with the key words 'milk of calcium', and 'tetraplegia or paraplegia', yielded only one reference.¹ The diagnosis of renal milk of calcium depends on the demonstration of the typical 'half-moon' configuration on horizontal beam radiography.^{2,3} Since upright views of the kidneys are not performed in tetraplegic subjects, the diagnosis of renal milk of calcium may be missed in these patients.

Renal lithiasis is not uncommon in the tetraplegic patients. Extracorporeal shock wave lithotripsy (ESWL) is the preferred method of treatment of renal calculi in spinal cord injury (SCI) patients. Renal milk of calcium should be differentiated from a renal calculus in order to avoid unwarranted surgery, or ESWL.^{2,4,5}

Case report

In a 41-year-old male with traumatic tetraplegia, X-ray of abdomen in supine position showed multiple opacities in the region of the left kidney which were interpreted as renal calculi. (Figure 1). Computed tomography (CT) of the kidneys confirmed the presence of calculi in the mid-polar calyx. However, the density situated in the inferior calyx of the

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hydronephrotic left kidney exhibited a horizontal upper edge (Figure 2). This specific radiological finding as observed in the CT of kidneys, provided the clue to the presence of milk of calcium in the inferior calyx of the hydronephrotic left kidney.

Figure 1 X-ray of abdomen taken in supine position showed multiple opacities in the region of the left kidney which were interpreted as renal calculi. The small radio-opaque shadows in the right lumbar region represent the stones lying in the renal fossa outside the pelvicalyceal system. This patient had recently undergone extended pyelolithotomy on the right side. During open surgery, the small stones were flushed out of the renal calyces by vigorous irrigation with normal saline. An incidental finding is multiple, calcified gall stones

Figure 2 Supine abdominal CT shows layering of calcific material in the left kidney with a typical horizontal upper border. Contrast this with the appearance of the calculi in the right side

Discussion

As plain film of the abdomen in standing position is not performed in SCI patients, physicians caring for SCI patients should have a high index of suspicion for the presence of renal milk of calcium. The following three radiological features of a calcific density in the renal area in a supine radiograph warrant further investigations to confirm the presence of renal milk of calcium:⁴ (1) Faint to moderately opaque density with indistinct or granular margins; (2) Change in shape between two successive X-rays; (3) Layering of calcific material.

If milk of calcium is suspected in a SCI patient, we perform computed tomography of the kidneys. Prompt diagnosis of milk of calcium will help the spinal cord injury physician to avoid unnecessary treatment. Accurate diagnosis of milk of calcium syndrome is vital since ESWL is illogical, inefficient, and probably more hazardous than useful in treating renal milk of calcium.⁶ Although the calcium content in renal milk of calcium will account for a difference in acoustical impedance, there can be no cleavage nor any fracture plane generated by ESWL within the fluid-calcium salt deposits.⁷ Milk of calcium in a hydronephrotic kidney can be irrigated with Suby G after introducing a ureteric catheter, or a flexible ureteroscope into the dilated calyx. It is possible that squamous cell carcinoma may arise from metaplastic urothelium in a renal calyx containing milk of calcium depending upon the severity and chronicity of the inflammation.²

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