Unsuspected serious abdominal trauma after falls among community-dwelling older adults

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Summary

Background: In elderly community-dwelling patients who experience ground-level falls, fractures or brain injury are the major concern. Serious abdominal injury is seldom contemplated.

Aim: Identify all such patients presenting after a simple fall and admitted with serious blunt abdominal trauma to a single academic medical centre.

Design: Retrospective chart analysis.

Method: All patients with both diagnoses aged 65 years or more admitted over 1 year to the department of medicine, geriatrics, surgery or urology were identified.

Results: Out of 546 patients screened, three cases of ground-level falls leading to splenic rupture, isolated gallbladder rupture with gallstone ileus and perinephric hematoma were found (0.55%) and are reported.

Conclusions: Falls in elderly patients are exceedingly common mandating recognition of even rare complications. Physicians should be more aware of the possibility of occult and serious consequences of blunt abdominal trauma after falls among older adults, albeit rare.

Introduction

Falls in older persons are a common and serious problem. One out of three adults aged 65 and older falls each year1 and the incidence increases to 50% in those over 80 years old. One fall is the harbinger of recurrences and side by side with superficial lacerations and hematomas—hip and other bone fractures and traumatic brain injury (TBI) are important causes of prolonged morbidity, dependence and early mortality in this age group.2–4 However, falls are also a cause of blunt abdominal trauma which may be clinically unapparent, present a considerable diagnostic challenge and cause diagnostic delay.5

We present three such cases identified by retrospective chart review to heighten primary care physicians’ and emergency physicians’ awareness of occult rupture of intra-abdominal organs—a rare, life-threatening complication of falls in older, community-dwelling adults.

Patients and methods

Computer-based retrospective chart review was undertaken in an academic general hospital. All patients aged 65 or more, presenting with a fall occurring in the community and admitted to the departments of medicine, geriatrics, surgery or urology over 1 year (1 January–31 December 2012) were included if the admission diagnoses included rupture or significant trauma of an internal (abdominal) organ.

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Results

Altogether, three patients were identified out of 546 admitted patients meeting inclusion criteria (0.55%) and are reported in detail because of their unique and differing case histories.

Case 1

A 70-year-old woman was presented to the emergency department (ED) from her home after a fall. She had a history of hypertension, obesity and depression with recent (1 year) cognitive decline and occasional falls. The fall occurred after she got up at night to urinate. On her way back to bed she became dizzy and fell on her back with a brief syncope associated with fecal incontinence, vomiting (once) and cold sweat.

In the ED, no bruising was found. Her blood pressure (BP) was 80/45 but this soon normalized with intravenous saline infusion (118/70) and her other vital signs, examination, electrocardiogram, chest X-ray and head computerized tomography (CT) were normal. She was admitted to the department of medicine and treated with ceftriaxone for fever and pyuria, intermittently complaining of pain in her back below the Lt. scapula.

On the fourth hospital day a marked tenderness was noted over that area, and the hemoglobin (Hb) gradually dropped from 12 g/dl on admission to 7.7 g/dl with systolic BP of 108 mmHg, tachycardia (104/min) and pre-renal azotemia. CT revealed rupture of the spleen with bleeding, fractures in the lower left ribs and a small left pleural effusion (Figure 1).

Immediate surgery confirmed stage 4 rupture of the spleen and total splenectomy was done with suction of 2l of blood from the abdominal cavity. The patient was followed up uneventfully for over a year.

Case 2

An independent 86-year-old woman was admitted to surgery from the ED 4 days after she fell at home. She had a history of diabetes, hypertension, anemia and a single hospital admission for acute cholecystitis 4 years prior which was treated conservatively. Cholecystectomy was then refused. After her fall, she developed gradually increasing abdominal pain associated with recurrent vomiting, diarrhea and dyspnea.

At the ED, her vital signs were normal but her abdomen was distended and tender and a right-sided hematoma was noted.

Abdominal X-ray showed small bowel obstruction. CT demonstrated air-fluid level within a gallbladder adherent to the colon at the hepatic flexure. A large gallstone was lodged in the distal descending colon obstructing the colon, which was dilated with pneumatosis intestinalis (Figure 2). Diagnosed as gallstone ileus the patient was urgently operated on. A fistula was identified between the colon and gallbladder. An ischemic-looking small and large bowel mandated cholecystectomy, total colectomy and partial resection of small bowel creating an ileostomy. The patient was then successfully treated for septic shock and multi-organ failure but remained ventilated and died 4 months later.

Case 3

An independent 82-year-old man fell in the street and was injured in his left loin. He was brought to the ED after he had macroscopic hematuria at home. His past medical history included hypertension, cerebrovascular accident, moderate aortic stenosis, right nephrectomy for hypernephroma 8 years prior and chronic renal failure (creatinine 2.5 mg/dl). He was not on anticoagulant treatment. On admission, left loin and left upper quadrant tenderness was found. CT revealed a large (mostly subcapsular) hematoma around the kidney and a small amount of sanguinous fluid in the peri-renal
and left retroperitoneal space (Figure 3). He remained stable and was discharged home after 10 days.

**Discussion**

Our first patient was admitted first to the department of medicine; the second and third were diagnosed in the ED. In all cases, there was a considerable diagnostic delay—in the first case, because the diagnosis was not considered, and in the remaining cases—because the patients remained at home (or got up and went home) after their fall.

When an elderly patient presents to the ED physicians following a fall, their prime concern is usually to rule out either bone fractures or TBI. The clinical examination and imaging are focused on susceptible bones (vertebrae, hip, forearm and hand, leg and ankle, pelvis) and the brain. However, the fact that during a fall, relatively minor blunt abdominal or back trauma can cause substantial damage to internal organs, yet trigger few complaints or suggestive signs, remains underappreciated.5

Our patients highlight the considerable diagnostic challenge and the variety of serious, little-considered consequences of blunt abdominal trauma due to ‘minor’ ground-level falls in elderly patients.

Case 1 presented with severe internal bleeding due to a ruptured spleen, yet she was admitted to the department of medicine after the usual imaging which did not include the abdomen. Her symptoms were assigned to ‘intercurrent’ urinary tract infection. A steady drop in Hb was finally noticed on the fourth hospital day and led to the diagnosis and curative operation.

The spleen is vulnerable and the most commonly damaged viscus in patients sustaining blunt abdominal trauma.6 Splenic rupture can even occur spontaneously, usually affecting diseased spleens and rarely, a normal spleen of a healthy patient.7 Trivial trauma including a fall, cough or vomiting as a cause of rupture of a normal spleen has been reported,8 and falls among older adults being so common1 constitute an important cause of potential splenic rupture which needs to be recognized. Hemodynamic instability, falling Hb levels, fracture of lower left ribs and left upper quadrant/back

**Figure 2.** Coronal non-enhanced abdominal CT showing air inside the gallbladder (short solid arrow) and intrahepatic bile ducts (long solid arrow); a fistula between the gallbladder and the hepatic flexure of the colon (dashed arrow) and a large gallstone in the distal descending colon (curved solid arrow). Dilated small bowel loops (short dotted arrows), pneumatosis in the cecal wall (long dotted arrows) and subcutaneous hematoma in the right abdominal wall (curved-dotted arrow) can also be seen.

**Figure 3.** Unenhanced abdominal CT in sagittal view showing a large subcapsular hematoma in the left kidney (solid arrows) and pararenal retroperitoneal hemorrhage (dotted arrows).
tenderness may occur together (as in our patient) or in different combinations supporting the decision for immediate imaging by CT or ultrasound which should be diagnostic.

Our second patient was not even brought to the hospital after she fell at home, her first and also her last fall, as it was ultimately fatal. As identified in the CT scan and confirmed at surgery, her diseased gallbladder ruptured into the colon after the blunt minor trauma of her fall, discharging a large gallstone which caused mechanical bowel obstruction.

Gallstones are an infrequent cause of mechanical ileus but in patients over age 65 they accounts for a quarter of non-strangulated bowel obstruction, particularly in women. Most of these stones are at least 2.5 cm in size and impact in the narrow ileum. Colonic obstruction is unusual due to its width, but does occur, especially in narrowed segments due to previous diverticulitis. The gallbladder is anatomically well-protected and injury during blunt trauma is rare, identified in only 2.1% of 1449 patients. Most reported patients were involved in motor vehicle accidents and had multiple associated intra-abdominal injuries. Isolated gallbladder rupture is a rare occurrence and in a review of the English literature only 51 cases were identified. Isolated gallbladder rupture after a ‘simple’ fall in elderly patients is extremely rare although even cholecystoduodenocolonic fistula after blunt trauma had been reported.

Our third patient was also unusual as we have not been able to find a previous case of blunt trauma during a ground-level fall in the elderly causing renal contusion, hematoma and macrohematuria. Although ‘isolated’ urinary tract blunt injuries are uncommon, osteoporotic pubic ramus fractures following falls in elderly patients are not uncommon and can be rarely complicated by bladder injury.

Other notable complications of blunt abdominal trauma during falls in elderly patients include aortic dissection, atheroembolic disease and even small-intestinal perforation. All have been rarely described, but the very high and increasing incidence of falls among the elderly and the frequent failure of physicians to consider the possible implications of blunt abdominal trauma associated with falls, which may leave few external clues, mandates attention. Indeed, the recently reported increase in utilization rate of CT imaging for fall victims older than 55 years (approximately 15% per year from 1996 to 2006) may identify more patients with unsuspected serious internal injury.

In conclusion, our small series collected over 2 years demonstrates the potential of ostensibly minor blunt abdominal or back trauma during falls in elderly persons to be associated with occult serious injury to intra-abdominal organs.

Rupture of a normal spleen of a chronically inflamed gallbladder with stones or other structures (urinary bladder, abdominal aorta) or contusion of the kidney may occur and patients’ presentation may be delayed and misleading.

Higher index of suspicion towards intra-abdominal organ contusion and potential rupture during ‘minor’ falls is warranted.

Conflict of interest: None declared.

References


