# Incidental findings during emergency sonographic examinations: a case series

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**ABSTRACT**

The teaching of ultrasonography is rapidly being incorporated into emergency medicine (EM) training programs and clinical practice. Most literature focuses on appropriate indications for the performance of emergency ultrasonography, and most EM-related courses and programs limit their teaching to standard focused indications. Generally this will suffice; however, occasionally, incidental findings, which are beyond the realm of what is taught in these programs, have influenced patient care. In this paper we discuss 7 cases in which incidental findings were discovered during an emergency sonographic examination. In each case the findings changed the patient's disposition, diagnosis and, potentially, outcome.

**RÉSUMÉ**

On intègre de plus en plus l'enseignement de l'échographie aux programmes de formation en médecine d'urgence (MU) et en pratique clinique. La majeure partie de la littérature se concentre sur les indications appropriées pour le recours à l'échographie d'urgence et la plupart des cours et programmes reliés à la MU limitent leur enseignement aux indications spécifiques habituelles. En général, cette approche est suffisante; cependant, à l'occasion, des constatations fortuites dépassant le cadre de ces programmes ont influencé l'orientation des soins aux patients. Le présent article expose sept cas où l'on fit des constatations fortuites pendant un examen échographique d'urgence. Dans chacun des cas, les constatations modifièrent le traitement du patient, son diagnostic et, potentiellement, le résultat final.

## Introduction

Emergency ultrasonography (US) is, by definition, goal-directed and limited.[1] Primary indications for emergency US include the detection of intraperitoneal fluid in blunt abdominal trauma, intrauterine gestation in suspected ectopic pregnancy, gallstones or a sonographic Murphy sign in patients with right upper quadrant pain, hydronephrosis in suspected renal colic, aortic dilatation in suspected abdominal aortic aneurysm, and pericardial fluid in cases of possible pericardial tamponade. Most courses and programs that teach emergency department US address only findings related to these primary indications. Although this is generally adequate, situations arise in which the recognition of other morbid conditions will enhance patient care; therefore, increased knowledge of regional sonographic abnormalities can be important.

Incidental sonographic findings are frequently discussed in the radiology literature. Published studies suggest that 9% to 15% of abnormalities found during abdominal US

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are unsuspected.[2] The most common incidental finding is a renal mass, which is discovered in as many as 13% to 48% of patients undergoing an abdominal sonographic examination for non-urologic complaints.[3–8] Other incidental conditions such as hepatic hemangioma, polycystic kidney, abdominal aortic aneurysm, aortic dissection, pelvic mass and adrenal mass have also been reported.[9]

At the Los Angeles County/University of Southern California (LAC/USC) Medical Center, emergency US is taught in a 2-day, 16-hour curriculum that is focused and goal-oriented. Emergency physicians are trained to look primarily for findings related to the standard emergency department US indications. Occasionally, however, incidental sonographic findings impact the patient's disposition and potential outcome. We descibe 7 cases of incidental pathology that were brought to the our attention over an 8-month period and discuss how these findings affected patient disposition and outcome. We also consider the significance of incidental findings with respect to emergency US training and the future of emergency US.

## Case reports

LAC/USC Medical Center is large public hospital in downtown Los Angeles with an annual emergency department census of 151,000 patients. The department hosts an emergency medicine training program, and emergency US has been available for use in the department since 1993. The following patients (Table 1) presented to the LAC/USC Medical Center emergency department during an 8-month period, from June 1995 to January 1996. Each case was independently reviewed by the authors and met the following case definitions: 1) emergency department sonographic examination was performed because of a primary indication discussed previously; 2) one or more incidental findings were discovered during the exam; 3) the incidental findings were confirmed by a formal imaging study and; 4) the incidental findings changed the patient's working diagnosis or disposition.

### *Case 1*

A 37-year-old woman presented with abdominal pain, vomiting and diarrhea, and received a diagnosis of "acute gastroenteritis." One month later she returned with worsening abdominal pain, now localized to the right upper and lower quadrants. A sonographic exam was performed because of suspected gallbladder disease. The gallbladder was normal, but a "fibroid-appearing" uterus and questionable ovarian mass were noted. These findings prompted the performance of formal US, which demonstrated a large right leiomyoma, right hydrosalpinx and dermoid cyst. She underwent a right salpingo-oophorectomy, left salpingectomy, left cystectomy and total abdominal hysterectomy. Postoperatively, she did well.

### *Case 2*

A 55-year-old woman presented with a 4-hour history of mid-epigastric pain, nausea, anorexia and chills. She had had previous similar episodes, but less severe. Her physical exam was significant for right upper quadrant tenderness. Emergency US was performed, looking for gallbladder pathology. Instead, the results of the sonographic exam demonstrated an inhomogeneous liver mass, which prompted a formal study. Radiology US confirmed these findings, and an abdominal CT scan subsequently demonstrated a benign hemangioma. The patient was discharged with appropriate follow-up.

**Table 1. Seven cases of incidental pathology found during emergency sonographic examination**

| Case | Indication for ultrasonography | Findings | Final diagnosis |
|---|---|---|---|
| 1 | RUQ*/RLQ† pain | Cystic abdominal mass | Leiomyoma and hydrosalpinx |
| 2 | RUQ pain | Inhomogeneous liver mass | Hemangioma |
| 3 | Flank pain | Cysts in liver, spleen and kidneys | Polycystic kidney disease |
| 4 | To assess aorta | Double lumen aorta | Type 3 aortic dissection |
| 5 | RUQ pain | Right renal mass | Grade II renal cell cancer |
| 6 | RUQ pain | Multiple hypoechoic lesions in the liver | Stage IV gallbladder cancer with liver metastasis |
| 7 | Right flank and RUQ pain | Right perinephric mass | Metastatic lung cancer |

*RUQ = right upper quadrant
†RLQ = right lower quadrant



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### *Case 3*

A 42-year-old man presented with a 3-week history of flank pain. He had experienced similar pain 8 years before, which was diagnosed as renal colic; however, it was not clear that a formal imaging study had been done. His urinalysis was significant for hematuria, so a sonographic exam was performed to look for hydronephrosis or urinary calculi. The sonogram revealed multiple cysts in both kidneys, liver, and spleen, and the diagnosis of polycystic kidney disease was made. Antihypertensive medication was initiated and he was referred to the nephrology service.

### *Case 4*

A 38-year-old woman presented with a 1-day history of back pain. Because she had a previous ascending aortic dissection repaired 1 year earlier, the general surgery service was consulted. They diagnosed sciatica and prescribed outpatient analgesia, but the emergency physician elected to examine her aorta prior to discharge. The emergency department sonogram revealed a double lumen involving the descending aorta. The patient was then admitted, and a CT scan revealed distal extension of her previous dissection. She was ultimately discharged on antihypertensive medication with the diagnosis of a type 3 aortic dissection.

### *Case 5*

A 43-year-old woman presented with a 2- to 3-month history of intermittent right upper quadrant pain. The emergency physician suspected cholelithiasis and scheduled formal US. Prior to discharge, the physician performed an emergency sonographic exam to confirm gallstones. Instead, the sonogram demonstrated a right renal mass. Formal US confirmed the findings, and the patient was admitted for resection of a Grade II renal cell carcinoma. She did well postoperatively.

### *Case 6*

A 69-year-old woman presented with a 2-week history of colicky mid-epigastric pain and right upper quadrant tenderness. The emergency sonogram showed multiple hypoechoic lesions within the liver parenchyma. She was admitted to the hospital; investigations yielded a diagnosis of Stage IV gallbladder cancer with liver metastases.

### *Case 7*

A 41-year-old man presented twice to the ambulatory clinic because of right chest and flank pain. Both times, analgesics were provided and the patient was reassured. One month later, he presented to the emergency department with flank and right upper quadrant pain. Emergency US was performed for suspected gallbladder disease; however, the sonogram demonstrated a perinephric mass. Formal US and abdominal CT revealed bilateral peri-renal masses. The patient was admitted to hospital and was found to have lung cancer with widespread metastases.

## Discussion

Emergency physicians frequently evaluate patients who require sonographic examination, and many emergency physicians have been taught to perform focused US. At LAC/USC Medical Center emergency physicians perform bedside sonographic exams in cases of blunt abdominal trauma, suspected renal colic, biliary tract disease, ectopic pregnancy, pericardial tamponade or abdominal aortic aneurysm. Our substantial experience includes many cases where unsuspected pathologies were identified. Although these findings fall beyond the realm of "limited emergency department ultrasonography," they have significant implications for the patients and for the emergency physicians involved.

This case series illustrates that emergency department US can lead to more timely diagnoses and improved patient outcomes. While this was not a controlled trial and does not prove the benefit of emergency department US, it seems apparent that all of the patients benefited from having a diagnosis made in the emergency department rather than at a later date or not at all. For example, patients 1, 5 and 6 had unsuspected conditions identified and underwent urgent operative intervention. Patients 3 and 4 had important management changes initiated to prevent sequelae such as hypertensive end-organ damage or progressive aortic dissection.

The case of patient 5, who had an unexpected renal mass, best illustrates the potential for emergency US to alter treatment and outcome. Renal masses are relatively common incidental findings,[3–8] and renal cell carcinoma has been identified as an important alternative diagnosis in emergency medicine literature.[10] Previous studies show that when renal tumours are discovered serendipitously their size is smaller, their stage is lower, and 5-year survival rates are higher than when they are suspected clinically.[3,5,11–13] Thompson and Peek[11] suggested that the only potential to improve renal cell carcinoma outcomes lies in the possibility of earlier detection as an incidental finding.

Some would argue that it is better to refer patients for formal outpatient US than to perform a sub-optimal study in the emergency department. In fact, at least 5 of the patients whose cases are described here would have been referred for formal US had it not been available in the emergency department. However, Schlager[14] found that 21% of patients who were scheduled for a free outpatient sonographic examination failed to keep their appointment and did not have the



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study performed. This could be disastrous for patients with potentially lethal conditions (such as patients 4, 5, 6 and 7 cited here), where prompt diagnosis is important.

Current emergency department training focuses on primary findings almost to the exclusion of other pathology. The cases cited here demonstrate that incidental findings can substantially impact patient care and that a broader knowledge in the performance of US may make emergency physicians more effective. We believe that training in emergency department US should continue to focus on the accepted primary indications and findings, but we also believe that more emphasis must be placed on the awareness and detection of additional regional findings. In fact, the lack of such knowledge has been a focal point for radiologists who oppose the performance of US in the emergency department and this lack of knowledge is considered a risk management concern by many. If these important diagnostic findings were consistently included in emergency department US curricula, emergency physicians would be better prepared to identify pathology that requires a formal imaging study.

## Conclusions

Incidental findings play a small but significant role in improving patient care for those patients who have a sonographic examination in the emergency department. Cases such as those described in this paper have implications for future emergency US training. The lessons learned should ultimately improve outcomes for our patients.

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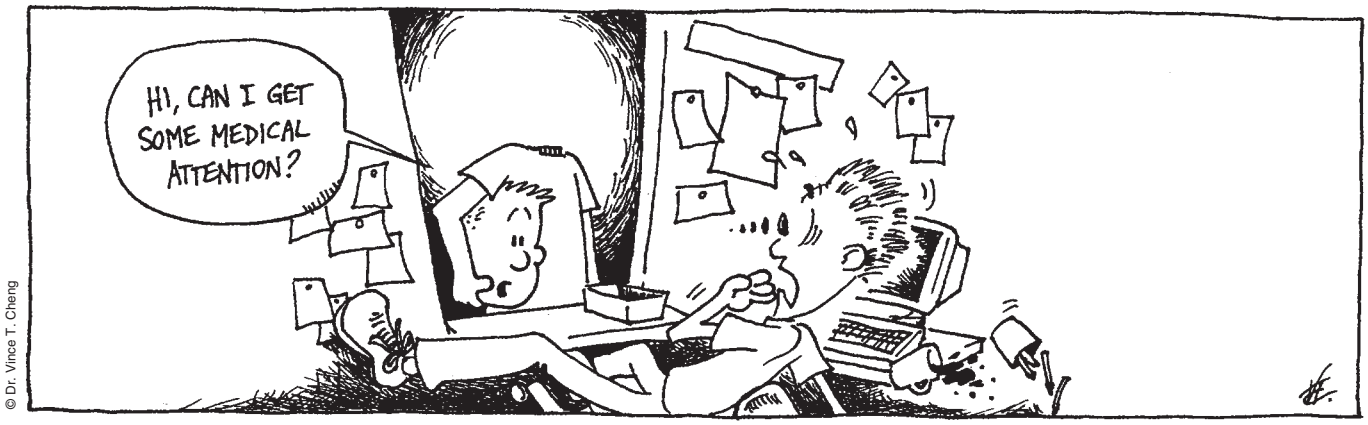






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