



UPDATE IN RADIOLOGY

## Routine abdominal X-rays in the emergency department: A thing of the past?☆



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**Abstract** The large number of abdominal X-ray examinations done in the emergency department is striking considering the scant diagnostic yield of this imaging test in urgent disease. Most of these examinations have normal or nonspecific findings, bringing into question the appropriateness of these examinations. Abdominal X-ray examinations are usually considered a routine procedure or even a “defensive” screening tool, whose real usefulness is unknown. For more than 30 years, the scientific literature has been recommending a reduction in both the number of examinations and the number of projections obtained in each examination to reduce the dose of radiation, unnecessary inconvenience for patients, and costs.

Radiologists and clinicians need to know the important limitations of abdominal X-rays in the diagnostic management of acute abdomen and restrict the use of this technique accordingly. This requires the correct clinical selection of patients that can benefit from this examination, which would allow better use of alternative techniques with better diagnostic yield, such as ultrasonography or computed tomography.

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### PALABRAS CLAVE

Abdomen;  
Radiografía;  
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Diagnóstico;

### Radiografía del abdomen en Urgencias. ¿Una exploración para el recuerdo?

**Resumen** La escasa rentabilidad diagnóstica de la radiografía de abdomen en patología urgente contrasta con el elevado número de exploraciones que se realizan. La mayoría arroja hallazgos normales o inespecíficos, lo que cuestiona la idoneidad de su indicación. Suele

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**Indicaciones;  
Adecuación**

considerarse un procedimiento rutinario o incluso una herramienta “defensiva” de cribado, cuya utilidad real se desconoce. Desde hace más de 30 años, se recomienda en la literatura científica reducir tanto el número de exploraciones como el de proyecciones realizadas, en aras a disminuir dosis de radiación, molestias innecesarias para los pacientes y costes.

Radiólogos y clínicos deben conocer las importantes limitaciones de la radiografía de abdomen en el manejo diagnóstico de la patología abdominal aguda y restringir su empleo. Para ello, es imprescindible una adecuada selección clínica de los pacientes candidatos a estudio de imagen, que permite un empleo ágil de técnicas alternativas más rentables como la ecografía o la tomografía computarizada.

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## Introduction

The evaluation of a healthcare technology is a complex task whose objective is to balance the actual benefits for the patient and the possible risks, disadvantages and costs derived from its implementation. The radiological setting includes five levels referring progressively to technical quality, diagnostic yield, diagnostic and therapeutic impact and health progression.<sup>1</sup> Parameters such as image resolution are useful to evaluate the first level while sensitivity and specificity or predictive value are useful to evaluate the second being relatively easy up to this point to verify progression with respect to the previous standard. Making progress in the evaluation process is extremely difficult especially in techniques consolidated by use, for which there are no defined evaluation guidelines and where scientific evidence can be of low quality or non-existent. In practice it is assumed that an examination is useful when the result modifies clinical management, to confirm or rule out a diagnostic choice or else to stage the risk of a potentially serious situation.<sup>2</sup> When radiology is used routinely as a “rubber stamp” to be stamped on every patient<sup>1</sup> it is difficult to prove its effectiveness, since there is no previous clinical question to answer. Also an examination that does not contribute any information can only contribute confusion (e.g., incidental or unspecific findings).<sup>3</sup> The following pages are intended to show how abdominal radiography (AR) in the emergency setting is an example in the negative way of all the above: an imaging modality consolidated by use of whose clinical usefulness there is little scientific evidence—or if there is any evidence there is negative evidence—in spite of which it maintains a long list of possible clinical applications that everyday reality surpasses broadly making it a routine for every patient that goes to the emergency services (ES) with abdominal symptomatology regardless of its characteristics and the degree of severity. Radiologists and clinicians alike need to know the important limitations of AR to detect acute pathologies with the promptness and precision of other image modalities basically ultrasounds and computed tomographies (CT). They must resort to the latter regardless of the AR result when the clinical context suggests a serious pathology. In mild cases, the remote probability of positive findings also advises against the use of AR.

## Diagnostic approach to patients with acute abdominal symptomatology

Pain is the most constant clinical manifestation of acute abdomen condition and a common cause for going to the ES in adults.<sup>4-6</sup> The medical history, the physical examination and lab tests are the starting point of its clinical study and usually enough in mild cases. In the remaining cases although they can give clues about the nature and location of the causal process they often yield unspecific results that need to be completed with image tests.<sup>5</sup> Such tests should provide ideally either in positive or negative significant information for the therapeutic decision. A positive result establishes a diagnosis (e.g., intestinal obstruction [IO]), or its etiology (e.g., peritoneal adhesion) and location (e.g., distal ileum), and it even allows us to stage its severity (e.g., closed-loop obstruction with signs of intestinal ischemia). A reliable negative result promotes an early discharge from the ES avoiding admissions and unnecessary expenses. When correctly indicated and performed timely a decisive image examination improves diagnostic accuracy, promotes surgical indication, planning and approach, speeds up the discharge or admission decision-making process, reduces hospital stays, improves service quality and diminishes morbimortality.<sup>7,8</sup> On the contrary image modalities add little value, or even subtract value, in patients with mild symptomatology, candidates to clinical management<sup>2,5</sup> or when the modality selected is not the right one—situations that only increase the dose of radiation, the time spent in the ER and the patient’s discomfort and healthcare costs.<sup>5</sup>

Acute abdominal pain can be associated to a variable degree of severity and be due to multiple causes.<sup>5</sup> Appendicitis, IO, diverticulitis, cholecystitis, renal colic, acute intestinal pathology—including ischemia and perforation—pancreatitis or gynecological disorders are diagnoses that need to be taken into consideration whose frequency varies in the different publications and epidemiological profiles. Although one in 3 patients who go to the ER due to abdominal pain is discharged without identifying any causes,<sup>3,4,7,9</sup> expediting those discharges requires decisive image modalities (Fig. 1). The diagnostic management of acute abdomen differs from one country to another with two major trends, early use of CT or clinical examination complemented with simple radiography and ultrasound

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