

Abdominal Calcifications — Symptoms and Radiology

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Abdominal calcifications are generated by a wide range of normal and pathological factors. The prominent symptom of abdominal calcification is the pain experienced by the patient. Abdominal calcifications are categorized into four groups according to their morphology, i.e. concretions, conduit calcification, cystic calcification, and solid mass calcification. The anatomical location of the calcification aids in the establishment of a reasonable differential and definite diagnosis. This categorization and location of calcification should be accompanied by radiology to facilitate effective management.



Background

Abdominal Radiographs

[Abdominal radiographs](#) are part of the **routine diagnostic workup for patients presenting with an acute abdomen or abdominal trauma**. These are performed using the conventional X-ray beams and were the cornerstone in the management of these patients before the advent of computed tomography (CT) scan.

The abdominal radiographs generally consist of two main views, an **anteroposterior supine view** with the patient in a supine position, and an **erect view** with the patient standing. The other views, for instance, lateral decubitus view, oblique view, and dorsal decubitus view are performed when indicated.

An erect chest X-ray should be performed in a patient with an acute abdomen only if the possibility of **viscus perforation** is high.

The optimal abdominal radiograph should show the diaphragm, lateral abdominal wall musculature, and the pubic rami. When the image does not show the whole abdomen, one can miss the detection of certain abnormalities, such as abdominal calcifications which are the focus of this article.

How to interpret an abdominal radiograph?

A **systematic approach** should be used while reading an abdominal radiograph to avoid misdiagnosis and missing an abnormality.

1. Check the patient's demographics, name, and the date of the film.
2. Review the bowel gas patterns.
3. Evaluate each intra-abdominal organ individually. During this evaluation, one should look for organomegaly, abnormal outlines or calcifications within the reviewed organ.
4. Evaluate each abnormal abdominal calcification trying to define the origin.
5. Evaluate the skeleton.
6. Evaluate the lung bases.
7. Document the findings from each of the above-mentioned steps.

Abdominal Calcifications

Abdominal calcifications are common on abdominal radiographs. It is **important to differentiate normal calcifications from the abnormal ones**. The correlation between the radiographic findings and the clinical picture of the patient is always helpful and recommended.

Renal Tract Calculi

Stones within the [kidneys](#), [ureters](#), and bladder can be visualized in most cases using a "**Kidneys, ureters and bladder**" (**KUB**) radiograph. Although the introduction of low-dose CT scans has taken the place of KUB radiographs, still they are used in emergency settings and in places where the facilities of a CT scan are not readily available.



Image: “KUB Radiograph, Roentgenogram or Medical X-ray image showing a large staghorn calculus involving the major calyces on the left and separate renal caliceal stones on the right. May not be to scale.” by Nevit Dilmen. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

Renal stones can be small, resembling punctate foci of calcification, or they may be large enough to fill the renal calyces, called the staghorn calculi.

The stones can also be seen within the ureters. The ureters pass down the lateral borders of the transverse processes of the lumbar spine. The most common sites for an entrapped ureteric stone are **pelvico-ureteric** and the **vesicoureteral junctions**.

Urinary bladder stones can be easily visualized. They are usually large and are caused by chronic cystitis or urinary stasis.

Gallbladder Stones

Gallbladder stones are mostly radiolucent, in contrast to renal tract stones, and are not visualized on X-ray.

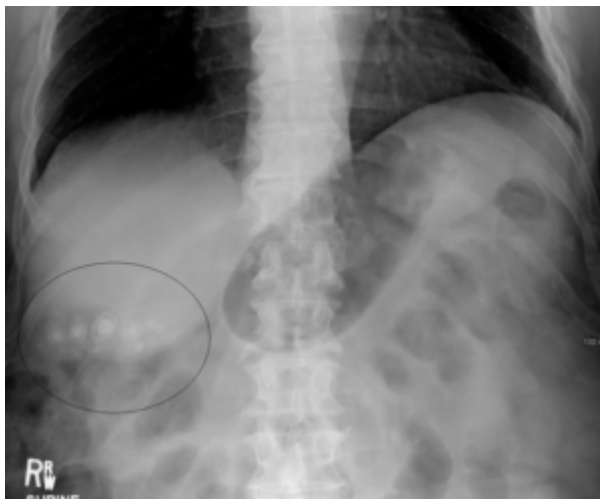


Image: “Stones X-ray” by James Heilman, MD. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

Approximately, only 10% of gallbladder stones have enough calcium to be radiopaque; therefore, an **abdominal radiograph is not recommended for the routine evaluation of gallstones.**

When an abdominal radiograph is performed for other indications, it is always advisable to check the right upper quadrant to exclude incidental gallbladder stones.

Appendicoliths and Acute Appendicitis

Acute [appendicitis](#) is often a clinical diagnosis that is supported by the laboratory finding of leukocytosis. If an abdominal radiograph is ordered for some reason, appendicoliths might be observed in a few patients. The finding of an appendicolith is an indication for an urgent appendectomy and makes further imaging evaluation unnecessary in the symptomatic patient.

Vascular Calcifications

Phleboliths

Phleboliths are the **calcifications within the walls of the veins.** They are common in the elderly and are often asymptomatic. Phleboliths are **typically round, have a lucent center and have smooth borders.**

On the other hand, a renal calculus is irregular in shape and border and always has a homogenous high density. Still, sometimes, a phlebolith is misdiagnosed as a ureteric stone. For this reason, clinical evaluation is important.

When in doubt, an abdominal CT scan should be ordered as it clearly visualizes the urinary system and accurately differentiates between renal tract calculi and phleboliths.

Arterial calcifications

Arterial wall calcifications are usually **pathological** in contrast to venous mural calcifications which are usually benign. Arterial wall calcifications are strongly related to arterial stiffening and **atherosclerosis.** The points of vascular calcifications also correlate well with the sites of arterial aneurysms.

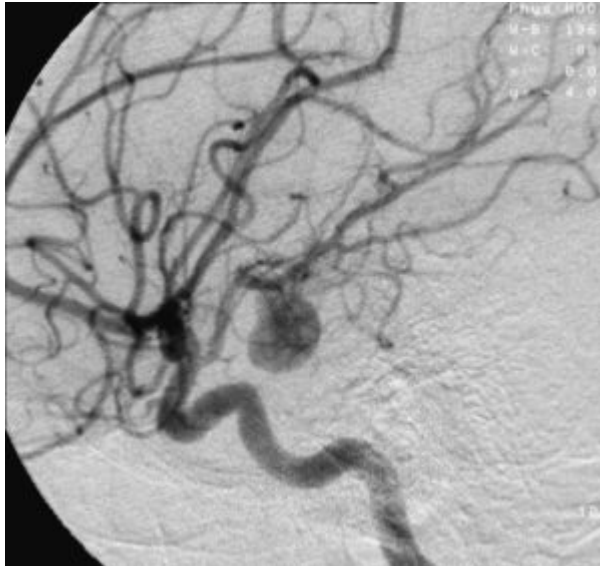


Image: "Aneurysm" by Lucien Monfils. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

If the possibility of an aneurysm is high, a CT angiogram is indicated. The urgency of further imaging and management depends on the hemodynamic stability of the patient.

References

James, B., & Kelly, B. (2013, September). *The Abdominal Radiograph*. Retrieved March 12, 2018, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3913410/>

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