

# Abdominal Calcifications: Symptoms and Radiology

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**Abdominal calcifications are generated by a wide range of normal and pathological factors. Pain is the predominant symptom of abdominal calcification. Abdominal calcifications are categorized into four groups according to their morphology, i.e. concretions, conduits, cysts, and solid masses. The anatomical location of the calcification facilitates reasonable differential and definitive diagnosis. The categorization and location of calcification should be accompanied by a radiological diagnosis for effective management of the patient.**



## Background

### Abdominal Radiographs

[Abdominal radiographs](#) are part of **routine diagnostic workup in patients presenting with an acute abdomen or abdominal trauma**. They are obtained using conventional X-ray beams and represent the cornerstone of patient management before using computed tomography (CT).

Abdominal radiographs generally entail an **anteroposterior supine view** with the

patient in a supine position, and an **erect view** with the patient standing. The other options—for instance, lateral decubitus, oblique, and dorsal decubitus views—are obtained when indicated.

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

The optimal abdominal radiograph should reveal the diaphragm, lateral abdominal wall musculature, and the pubic rami. When the image does not show the whole abdomen, certain abnormalities such as abdominal calcifications can be missed. This article focuses on the role of abdominal radiography in delineating calcifications.

## How to interpret an abdominal radiograph?

A **systematic approach** based on the following steps is needed to interpret an abdominal radiograph to avoid misdiagnosis or a missed abnormality.

1. Check the patient's demographics and name, and the date of the film.
2. Review the bowel gas profile.
3. Evaluate each intra-abdominal organ individually including organomegaly, abnormal outlines, or calcifications within the reviewed organ.
4. Evaluate each abnormal abdominal calcification to define the origin.
5. Evaluate the skeleton.
6. Evaluate the lung bases.
7. Document the findings from each of the aforementioned steps.

## Abdominal Calcifications

Abdominal calcifications are frequently detected on abdominal radiographs. It is **important to differentiate normal calcifications from the abnormal ones**. A correlation between the patient's radiographic and clinical findings is always 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 low-dose CT scans have replaced KUB radiographs, they are still used in emergency settings and in locations where the facilities for a CT scan are not readily available.

Renal stones can be small, resembling punctate foci of calcifications, or they may be large enough to fill the renal calyces and are known as staghorn calculi.

The stones are also visible within the ureters, which travel down the lateral borders of the transverse processes of the lumbar spine. **Pelvico-ureteric** and **vesicoureteral junctions** are the most common sites for an entrapped ureteric stone.

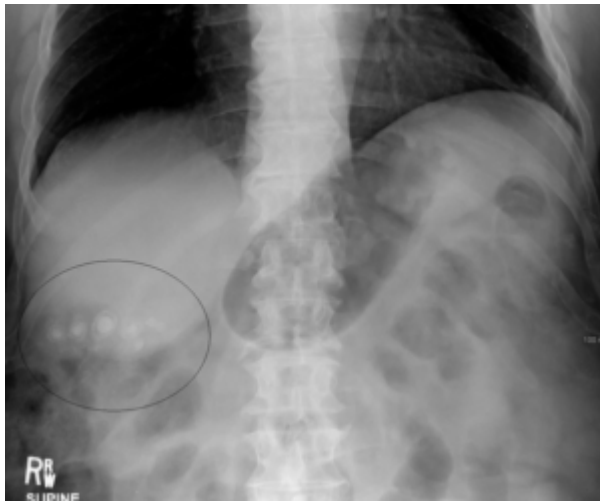
Urinary bladder stones are distinct and visible. They are usually large and caused by chronic cystitis or urinary stasis.

# Gallbladder Stones

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

Only approximately 10% of gallbladder stones carry enough calcium to be radiopaque; therefore, an **abdominal radiograph is not recommended for routine evaluation of gallstones.**

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



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

## Appendicoliths and Acute Appendicitis

The clinical diagnosis of acute **appendicitis** is often supported by laboratory findings of leukocytosis. The detection of appendicoliths in an abdominal radiograph is an indication for an urgent appendectomy without the need for additional imaging evaluation in the symptomatic patient.

## Vascular Calcifications

### Phleboliths

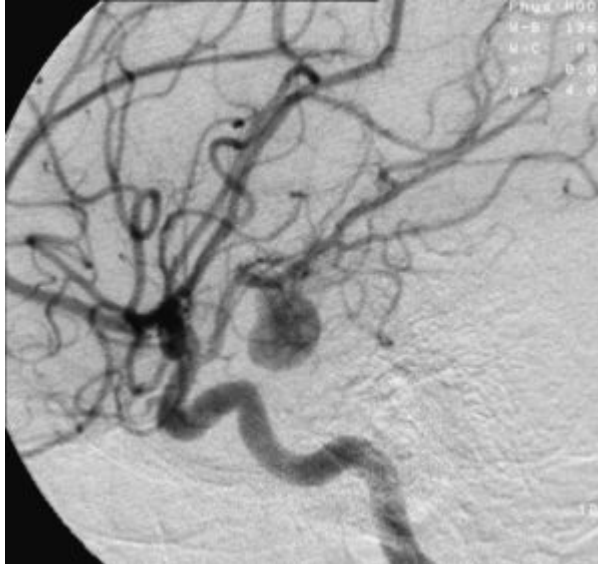
Phleboliths are **calcifications within the walls of the veins**. They are common in the elderly and are often asymptomatic. Phleboliths are **typically round, and have a lucent center and smooth borders.**

However, a renal calculus has an irregular shape and border and always shows a uniformly high density. Nonetheless, a phlebolith may be misdiagnosed as a ureteric stone warranting clinical evaluation.

When in doubt, an abdominal CT scan should be ordered to clearly visualize the urinary system and accurately distinguish between renal tract calculi and phleboliths.

## Arterial calcifications

Arterial wall calcifications are usually **pathologic** 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 strongly with sites of arterial aneurysms.



[Image](#): Aneurysm. By Lucien Monfils. License: [CC BY-SA 3.0](#).

A CT angiogram is indicated for high-risk aneurysms. The indications for further imaging and management depend on the patient's hemodynamic stability.

## References

James, B., & Kelly, B. (2013, September). *The abdominal radiograph*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3913410/>.

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