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# Secondary Hyperparathyroidism Mimicking Osteomyelitis

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## Background

- The advent of dialysis technology has improved outcomes for patients with end stage renal disease.
- End stage renal disease leads to endocrine disturbances such as secondary hyperparathyroidism.
- Literature is sparse on exact incidence and burden of secondary hyperparathyroidism among populations with end stage renal disease.
- This case reports examines a case of secondary hyperparathyroidism secondary to renal osteodystrophy that was mistaken for acute osteomyelitis.

## Case Report

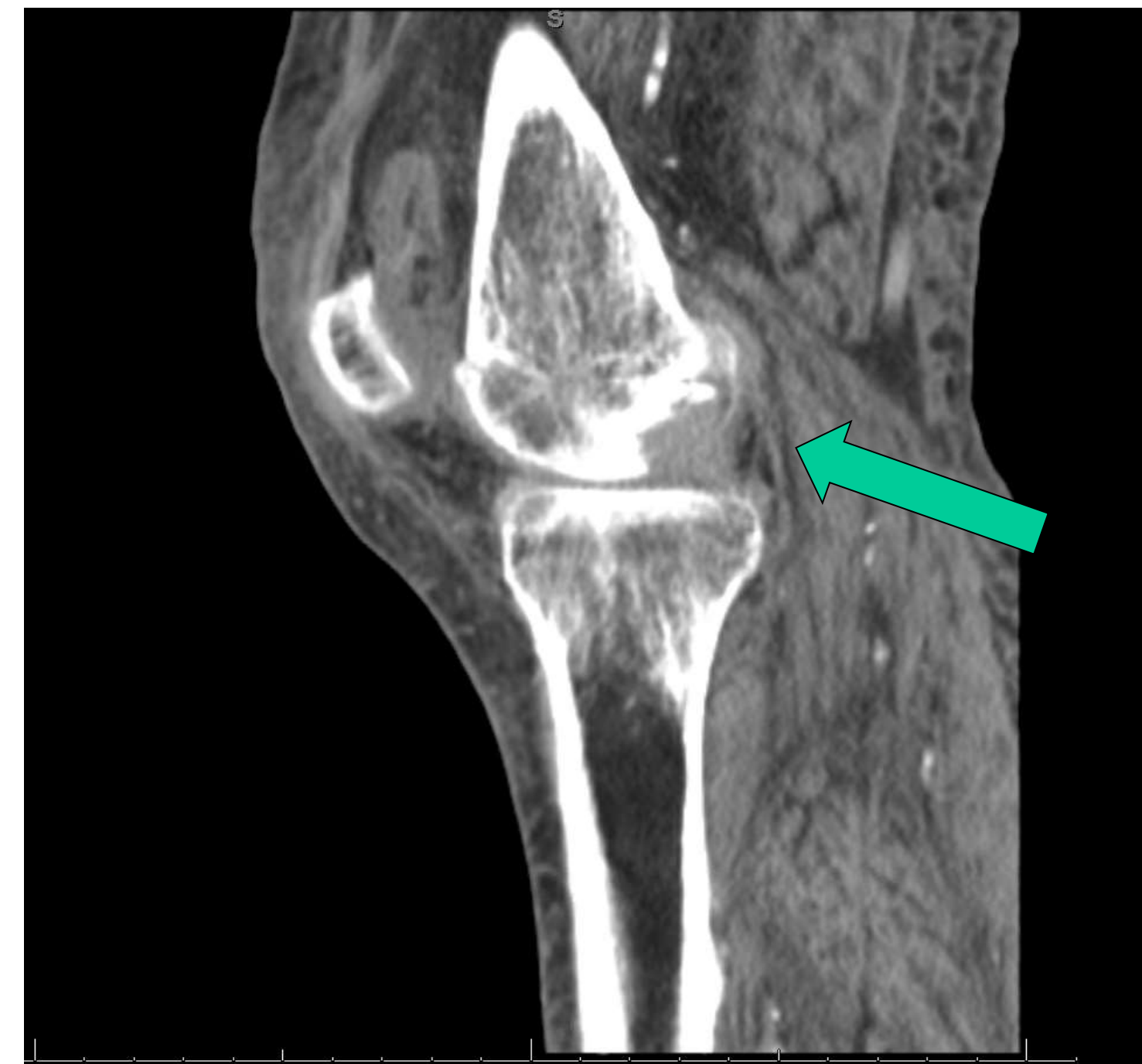
### Management at outside institution

- 59-year-old female patient with a complex medical history including end-stage renal disease on hemodialysis and HIV initially presented to an outside hospital with unilateral left knee pain.
- Pt had a fall prior to presentation. Ensuing left knee CAT scan (CT) was concerning for osteomyelitis or septic arthritis.
- Arthrocentesis left knee was unremarkable for infection.
- Outside hospital performed surgical irrigation and drainage of the knee and obtained bone biopsies of the left distal femur and proximal tibia based on suspicious CT imaging findings.
- Despite sterile bone cultures, six weeks of empiric broad spectrum intravenous (IV) antibiotics for suspected osteomyelitis were given.

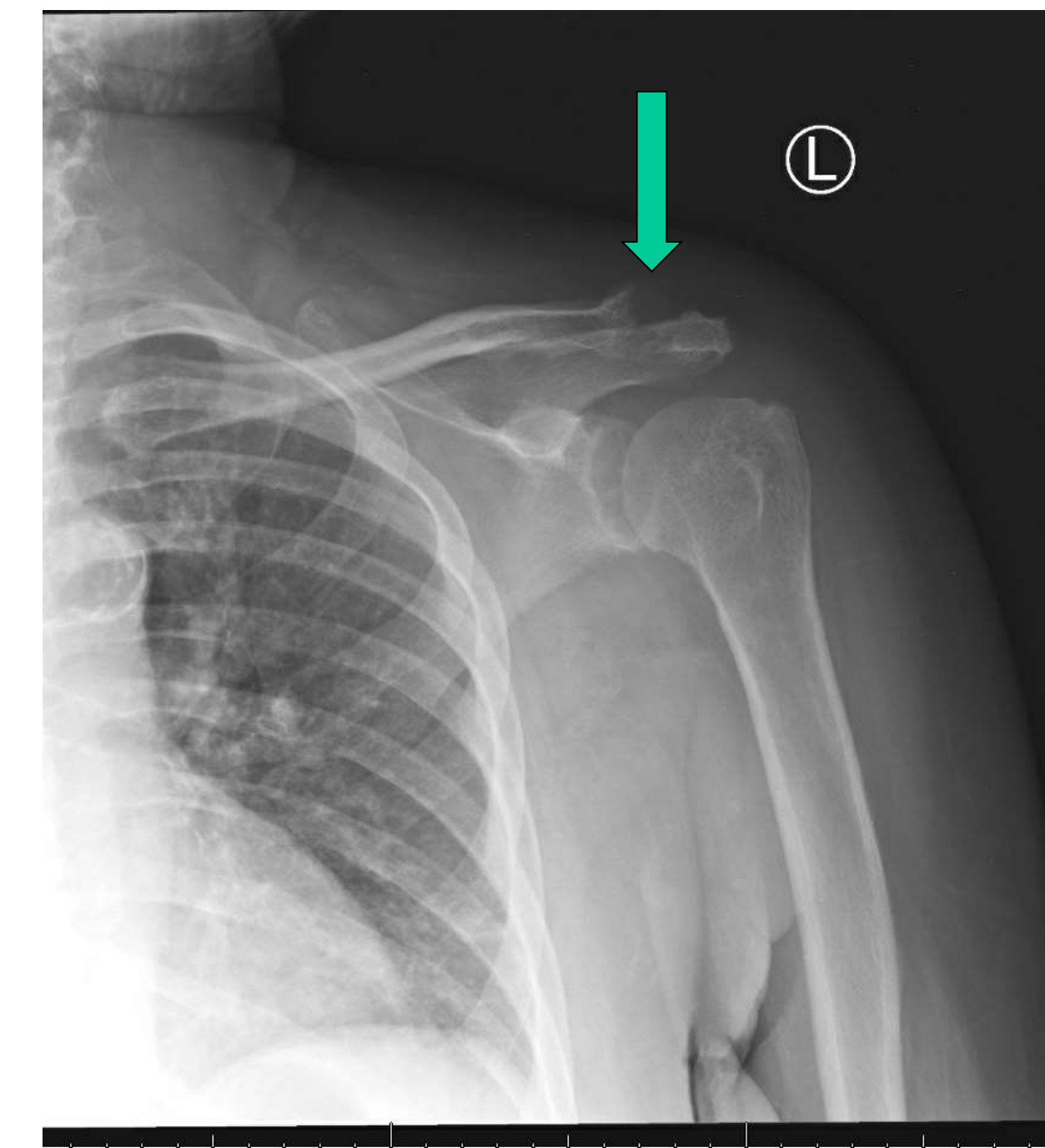
### Management at Henry Ford Hospital

- After completion of prolonged IV antibiotic course for osteomyelitis, patient presented to Henry Ford Hospital with worsening left knee pain and new-onset hip pain.
- Repeat CT of the knee (figure 1) demonstrated further bony erosion.
- Emergency department admitted patient for suspected worsening osteomyelitis.
- Further review of radiographic images from outside hospital, including X-ray of left shoulder (figure 2), Chest X-Ray (figure 3), X-ray of pelvis (figure 4) demonstrated longstanding widespread erosive changes.
- Further testing, including pelvic-MRI, and CT abdomen pelvis (figure 5), demonstrated widespread multifocal osseous resorptive changes.
- Labs were significant for an elevated serum PTH levels (2000 pg/mL); and normal serum calcium (9.7 mg/dL).
- Findings confirm diagnosis of secondary hyperparathyroidism due to renal osteodystrophy.

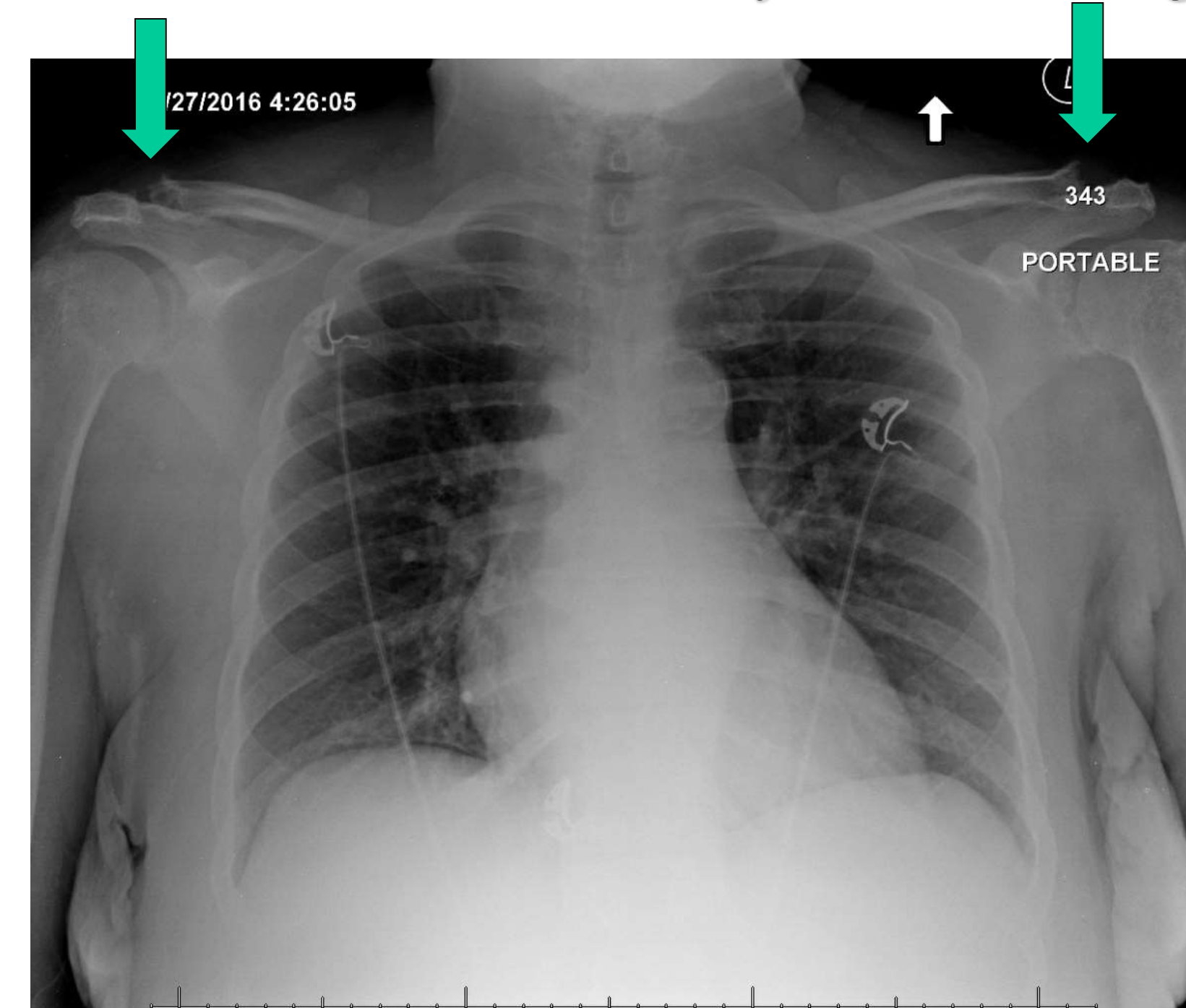
## Case Report



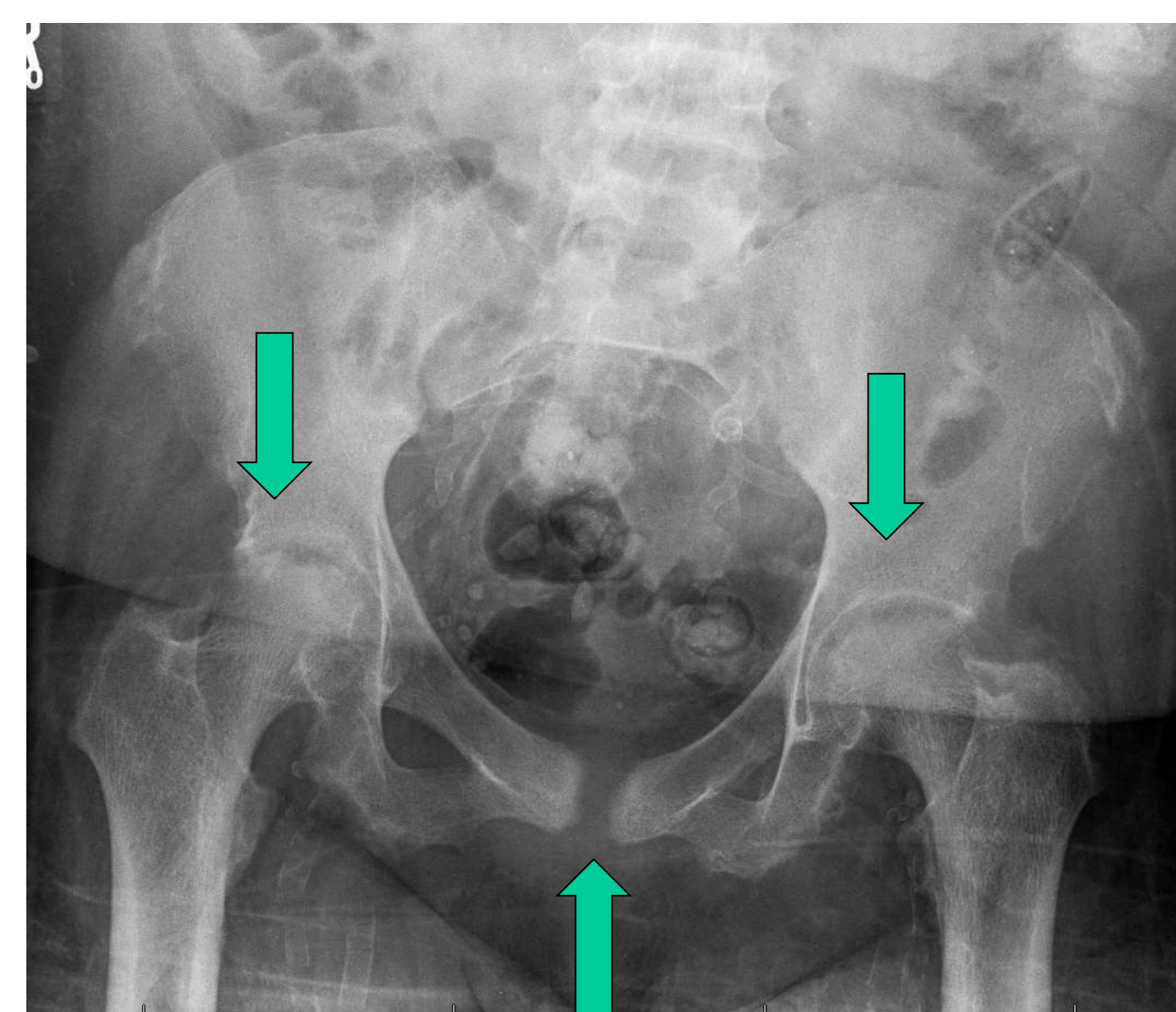
**Figure 1:** CT of the left knee showing significant erosive changes at the lateral compartment of the knee



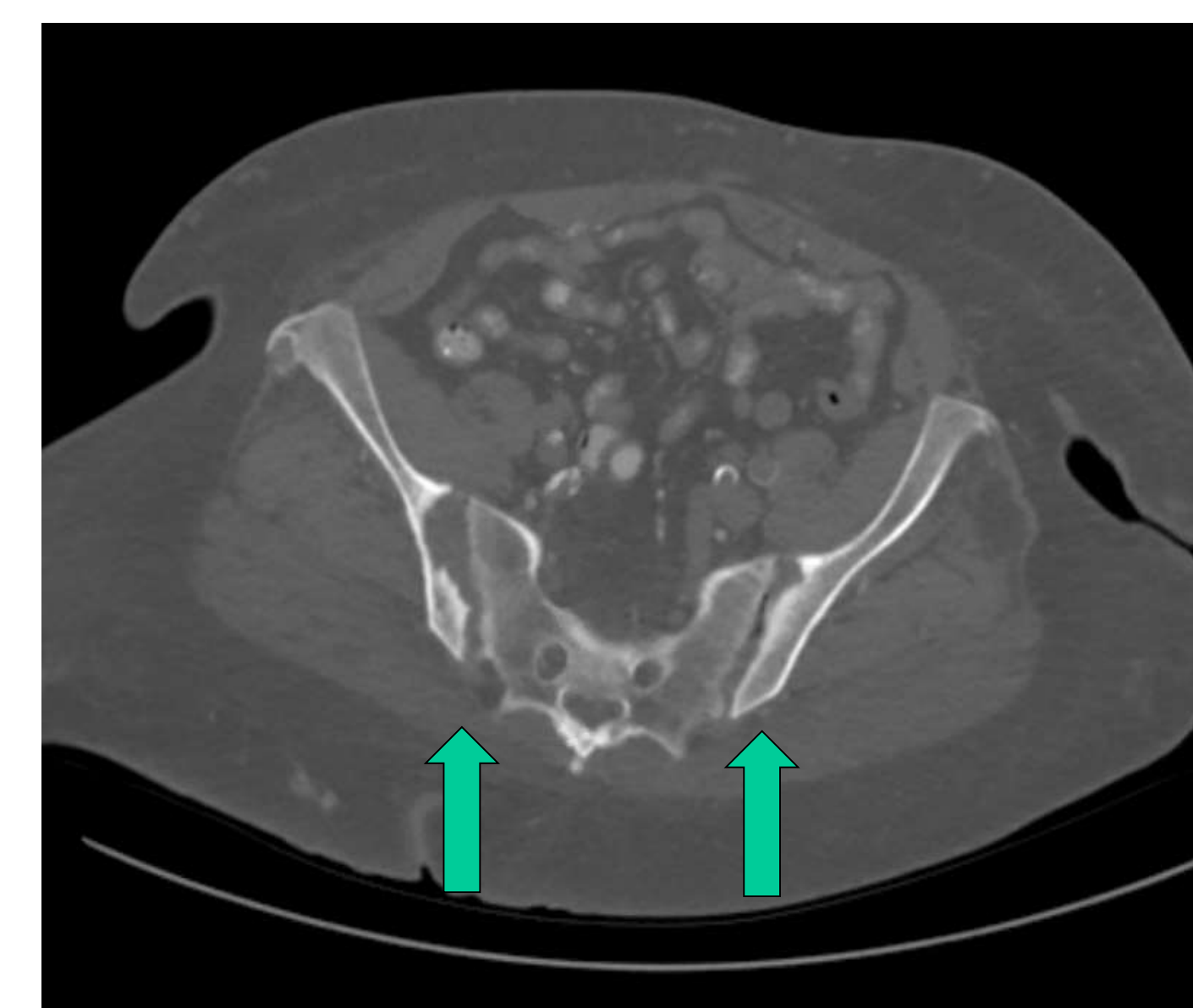
**Figure 2:** AP view of the left shoulder showing extensive erosive degradation of the acromioclavicular joint and widening of the joint space



**Figure 3:** Portable AP view of the chest showing bilateral erosive bony changes of the acromioclavicular joint



**Figure 4:** AP view of the pelvis demonstrating erosive bony changes of the right and left hip joints with erosive changes of the right greater than left SI joint. There is also a widened pubic synthesis.



**Figure 5:** CT abdomen pelvis at the level of the SI joints showing severe right greater than left degradation and a host of other changes at the SI joints

## Discussion

- This case highlights renal osteodystrophy from secondary hyperparathyroidism, a common sequelae of chronic kidney disease.
- Secondary hyperparathyroidism can manifest with numerous clinical signs and symptoms including widespread osseous resorptive changes that can mimic osteomyelitis.
- In this case, severe knee pain, elevated inflammatory markers and radiography findings misled the outside hospital to an incorrect diagnosis of osteomyelitis, resulting in unnecessary and incorrect treatment.
- The known history of end-stage renal disease, arthrocentesis and surgical findings discordant with infection indicated that further work-up and a broader differential diagnosis were needed in this case.
- The use of empiric antibiotics in cases of bone and joint infection must be considered carefully with the realization that empiric use prior to obtaining cultures will decrease microbiological yield, complicating the ability to confirm infection. Lack of culture growth will likely result in long term use of antibiotics after surgery that may not have been necessary.
- A more comprehensive differential diagnosis and careful work-up could have helped this patient avoid unnecessary invasive surgery and superfluous prolonged antibiotic treatment.

## Conclusion

- Secondary hyperparathyroidism can present in a wide range of clinical presentations, including destructive osseous changes<sup>1</sup>
- The successful diagnosis of this patient relied on radiographic imaging and confirmation with laboratory analyses
- It is important to remember there are numerous etiologies that can masquerade as osteomyelitis and present with significant osseous pathology
- An extensive differential diagnosis and heightened clinical suspicion for endocrine pathology is needed when faced with osseous destruction, especially if the clinical findings do not match the suspected diagnosis in the setting of chronic kidney disease

## References

1. Fraser, William D. "Hyperparathyroidism." *The Lancet* 374.9684 (2009): 145-58. ProQuest. Web. 17 Mar. 2019.
2. Hedgeman, Loren Lipworth, Kimberly Lowe, Rajiv Saran, Thy Do, and Jon Fryzek, "International Burden of Chronic Kidney Disease and Secondary Hyperparathyroidism: A Systematic Review of the Literature and Available Data," *International Journal of Nephrology*, vol. 2015, Article ID 184321, 15 pages, 2015.