The Beneficence of Serial Radiography in Diagnosing Osteomyelitis in Diabetic Patients

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What is Osteomyelitis?

An underlying inflammatory infection of bone tissue which can potentially cause permanent bone damage or death.



Often caused by the introduction of staphylococcus aureus (Staph).

Most commonly affects young children and older adult diabetic patients who suffer from chronic foot ulcers and non-healing wounds.

12% - 25% of diabetic patients suffer from foot complications, and of those, an estimated 20% - 60% reveal evidence of osteomyelitis.

Signs/Symptoms:

- Pain
- Erythema
- Heat to the area
- Swelling
- Visible abrasions

Osteomyelitis can look similar to common conditions such as cellulitis or Charcot neuroarthropathy because they all present similar signs and symptoms. This is why it is crucial X-rays are performed to increase confidence in the diagnosis before any treatment is administered.

What is Serial Radiography?

A form of radiography that involves obtaining a baseline, or scout image, then a subsequent series of images over a certain period of time.

3 benefits of using serial radiography to monitor osteomyelitis:

1. Conveniency
2. Cost Effectiveness
3. Time efficiency

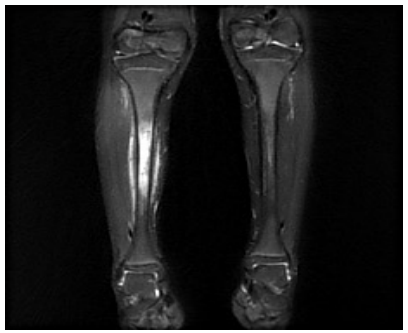
Conveniency

Serial radiography poses as a more convenient imaging option for diagnosing and monitoring osteomyelitis.

MRI is the preferred imaging method, but it is not as readily available to patients because of its lack of availability and overuse.

Serial radiography can be done at almost any healthcare facility, including urgent cares and clinics.

Serial radiography requires no extra equipment other than what is normally supplied for computed radiography (CR) or digital radiography (DR) systems.



Cost Effectiveness

Serial radiography is extremely more cost effective when compared to other imaging modalities used to diagnose and monitor osteomyelitis.

According to Table 2, the average X-ray has a cost range of about $50 to $100 dollars.

The price of other imaging modalities can range from $700 to $2,000 a scan.

Serial radiography can reduce the financial burden of the patient, especially when routine radiographs are needed to monitor the progression of osteomyelitis over prolonged periods of time.

Time Efficiency

Serial radiography is performed in a very timely manner when compared to other modalities.

According to the University of California, Davis Health, the average duration of extremity MRI exams range from approximately 25-45 minutes, whereas X-ray are usually performed in 10-15 minutes.

Shorter exposure times can greatly increase patient comfort and satisfaction.

Other imaging modalities, such as MRI, also experience scheduling delays whereas most serial radiography can be done quickly and within a walk-in setting.

Table 2. Pros, cons, and approximate cost of various imaging modalities.

Imaging Modality	Pros	Cons	Cost[25, 26]
X-Ray	Cheap	Low sensitivity, delayed findings	~$50-100
US	Cheap, useful in children and sickle cell patients	Low sensitivity, difficult interpretation	~$100-200
Bone Scintigraphy	High sensitivity	Poor specificity	~$150-600
CT	Useful for bony architecture, necrotic bone in chronic osteomyelitis, can guide biopsy	Increased cost and radiation exposure	~400-700
MRI	Highly specific for both acute and chronic osteomyelitis	High cost	~$700-1200
PET	Highly specific	High cost, limited availability	~$1000-2000

Conclusion

Serial radiography may not be the most accurate or sensitive modality to diagnose and monitor osteomyelitis, but it remains a highly beneficial option for struggling patients.

Because of the conveniency, cost-effectiveness, and time efficiency, serial radiography is an effective imaging tool for continuous evaluation of osteomyelitis.



References/Links

- A Comparison of Imaging Modalities for the Diagnosis of Osteomyelitis – table 2
- Osteomyelitis or Charcot neuro-osteoarthropathy?
- UC Davis Health: FAQ – MRI
- UC Davis Health: FAQ Radiology
- Osteomyelitis of the foot - 1st Digit image
- Osteomyelitis MRI of the tibia image
- Osteomyelitis of foot - 5th digit image