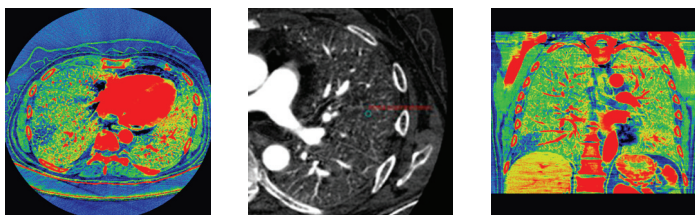


# Gemstone Spectral Imaging simplifies lung filling defect detection from a pulmonary embolism.

CT clinical case study—improved lung evaluation



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# Case study

## Using Gemstone Spectral Imaging's material density (MD) iodine (water) images help in clinical evaluation.

### Abstract

It goes without saying that imaging is an important tool in the prevention, diagnosis, and treatment associated with internal medicine. However, in the absence of an effective set of quantitative tools to accompany the images, a significant gap exists between what is perceived and what can accurately be determined.

An important benefit of the Discovery\* CT750 HD is Gemstone\* Spectral Imaging (GSI), which helps better apply information received through medical imaging towards solving pathological findings. For instance, GSI produces material density iodine (water) images that are useful in determining the presence or absence of iodine in the tissue in addition to the quantity of iodine that is present. In cases of Pulmonary Embolism, the clinical question to be answered is the presence or absence of a filling defect distal to the embolism. The MD iodine (water) image of GSI can aid the physician in visualizing such defects.

### Patient history

A 48-year-old male with a history of chondrosarcoma of right femur status post-surgery with right upper limb deep venous thrombosis.

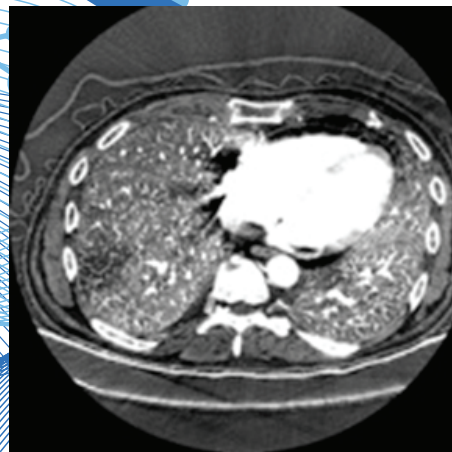
### Exam protocol

GSI acquisition  
GSI viewer MD iodine (water) images

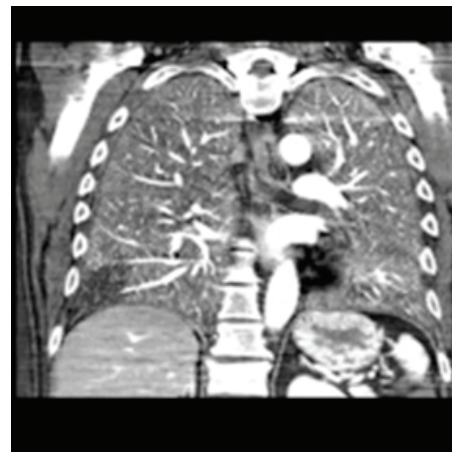
### Acquisition protocol

|                         |                       |
|-------------------------|-----------------------|
| Scanner:                | Discovery CT750 HD    |
| Scan type:              | GSI-Helical           |
| GSI preset:             | GSI-1                 |
| Rotation speed:         | 0.5 second            |
| Detector configuration: | 64 x 0.625            |
| Slice thickness:        | 0.625 mm              |
| Pitch:                  | 0.98:1                |
| SFOV:                   | 50 cm                 |
| kVp:                    | Low/High (80/140 kVp) |

GSI helps clinicians visualize filling defects quickly.



**Figure 1.** Axial iodine (water) image with hypoperfusion segment distal to occluded right subsegmental pulmonary artery



**Figure 2.** Coronal iodine (water) image hypoperfusion segment

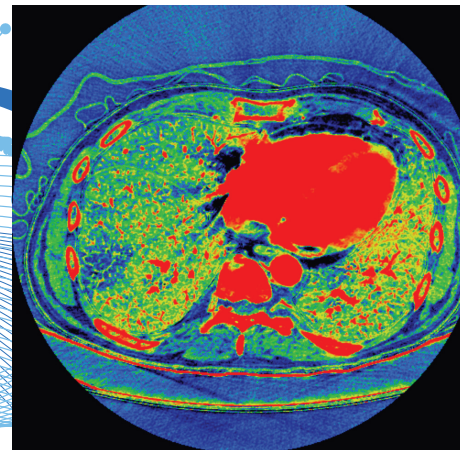
## Discussion and results

GSI Monochromatic image at 65 keV indicated a pulmonary embolism in the right subsegmental pulmonary artery. The MD iodine (water) image shows a wedge-shaped area of filling defect in the segment distal to the occluded vessel in the right lower lobe.

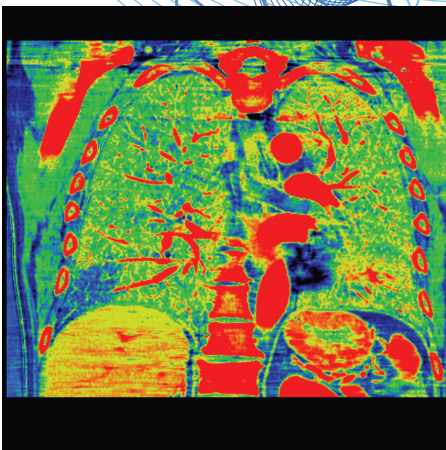
## Conclusion

Gemstone Spectral Imaging provides clinicians the opportunity to gather more information without compromise. In this case, doctors were able to go beyond common CT pitfalls—low-contrast resolution, artifacts, and noise—to discover a lung filling defect resulting from a pulmonary embolism which was uncovered with the help of the MD iodine (water) image.

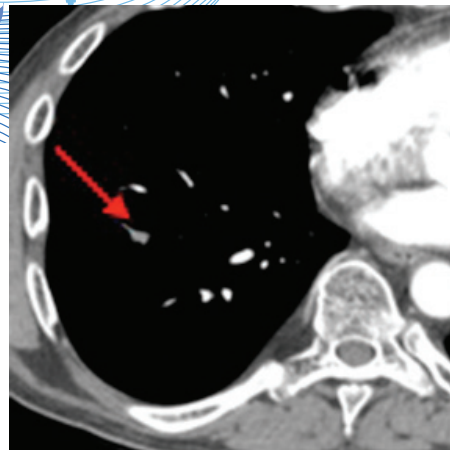
GSI allows clinicians to see more areas of interest, which decreases the need for theories and educated guesswork.



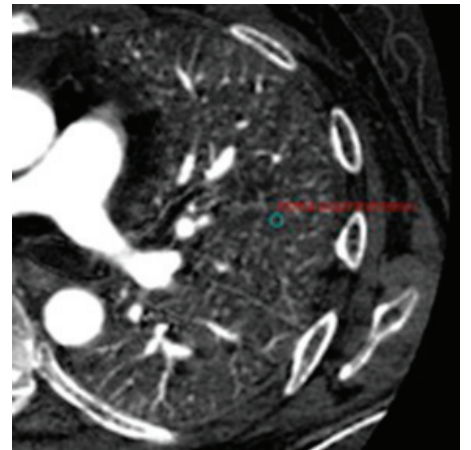
**Figure 3.** Axial iodine (water) image with hyperperfusion segment distal to occluded right subsegmental pulmonary artery



**Figure 4.** Coronal iodine (water) image hypoperfusion segment



**Figure 5.** Axial 65 keV with PE in right subsegmental pulmonary artery



**Figure 6.** Axial iodine (water) with ROI in normal enhancing lung parenchyma to determine best window level

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Our “healthymagination” vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access, and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at [www.gehealthcare.com](http://www.gehealthcare.com)

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