

# Sentinel Node Imaging of Laryngeal Cancer Using a Portable Gamma Camera With CdTe Semiconductor Detectors

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**Abstract:** A 59-year-old man with laryngeal cancer was scheduled to receive sentinel lymph node (SLN) navigation surgery. Radioactive colloids were endoscopically injected around the tumor. Three hours after injection, preoperative lymphoscintigraphy was performed using a new portable CdTe semiconductor camera as well as a conventional gamma camera. The semiconductor camera successfully identified an SLN neighboring the primary tumor over an acquisition time of only 30 seconds, whereas the conventional camera could not clearly visualize the SLN over the same acquisition time. This semiconductor camera also imaged the SLN in the operating room, 19 hours after the injection.

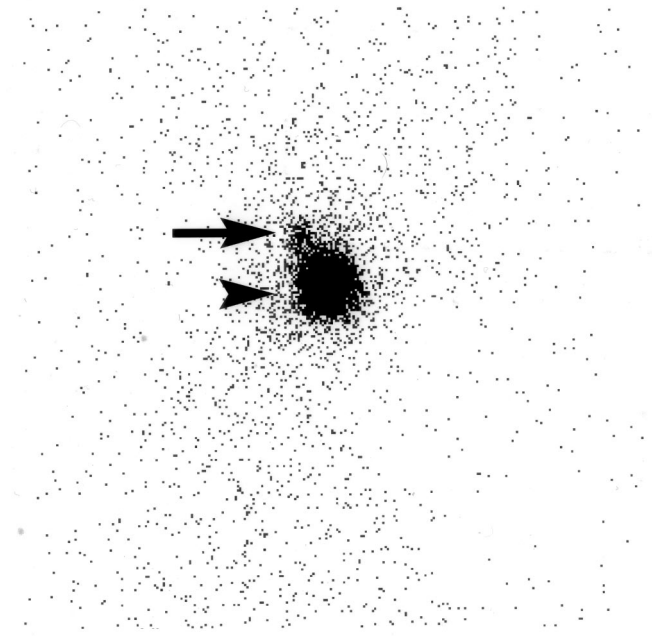
**Key Words:** laryngeal cancer, sentinel node, semiconductor detectors, intraoperative imaging

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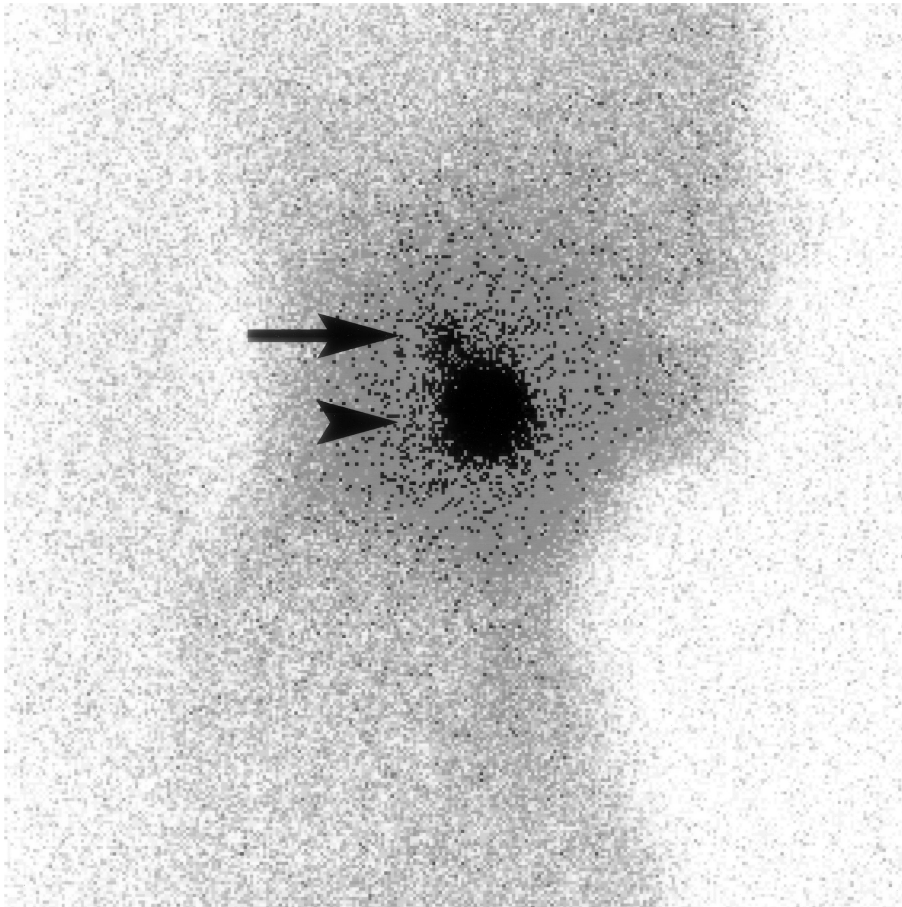
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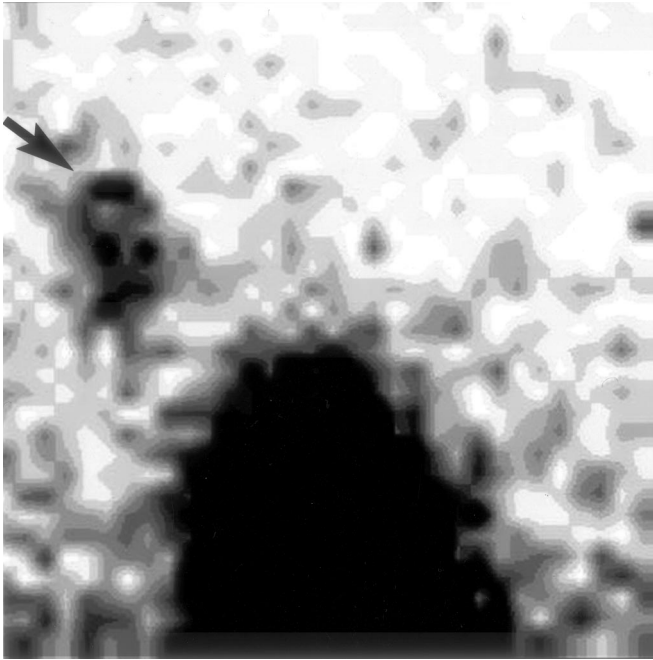
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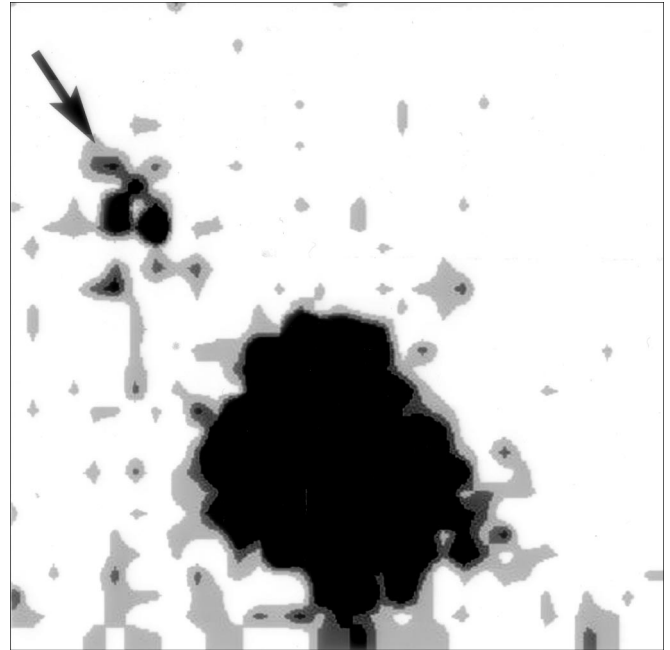
**FIGURE 1.** Cervical lymphoscintigram (right lateral view). The patient was a 59-year-old man with laryngeal cancer scheduled to receive sentinel node (SLN) navigation surgery.<sup>1-3</sup> Preoperative lymphoscintigraphy was performed to confirm the location of SLNs.<sup>4</sup> A dose of 74 MBq (2 mCi) of Tc-99m-labeled phytate was endoscopically injected into 2 peritumoral tissue sites (0.2 mL per site). Lymphoscintigrams were obtained 3 hours after injection.<sup>5</sup> This lymphoscintigram was obtained over an acquisition time of 60 seconds using a conventional gamma camera (GCA-7200A/DI; Toshiba, Tokyo). An ill-defined area of increased activity (arrow) was present adjacent to the injection site (arrowhead) but was not clearly identifiable as an SLN.



**FIGURE 2.** Lymphoscintigram with superimposed scattered photon image. The silhouette of the neck is now evident, demonstrating that the questionable faint activity (arrow) is located in the craniodorsal aspect of the primary lesion (arrowhead).<sup>6,7</sup>



**FIGURE 3.** SLN imaging by a portable gamma camera with CdTe semiconductor detectors. A newly developed gamma camera equipped with CdTe semiconductor detectors (Acro-rad, Uruma) was used to image the patient's neck to determine whether the area of equivocal activity identified near the injection site by the conventional gamma camera was an SLN. This portable semiconductor camera is compact and has good energy resolution.<sup>8</sup> This camera provided a clear image of an SLN (arrow) located in the craniodorsal aspect of the injection site over an acquisition time of only 30 seconds.



**FIGURE 4.** SLN visualized by the portable semiconductor camera on the day of surgery. The portable semiconductor camera clearly visualized an SLN (arrow) separate from the injection site 19 hours after the injection of Tc-99m phytate, although the acquisition time was prolonged to 60 seconds in consideration of the reduction of Tc-99m activity. This successful imaging result suggests that the device could also be useful for intraoperative imaging.<sup>9</sup>