Lymphoscintigraphy SPECT/CT: Instrumental Navigator in Repair of Thoracic Duct Injury

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A 25-year-old female underwent resection of a large mediastinal tumour which was complicated by copious chylothorax, being worse on the left side. Minimally-invasive video-assisted thoracoscopic surgery (VATS) via a left-sided approach was performed and the severed ends of the thoracic duct were ligated. This only achieved temporary reduction of the amount of chylothorax, leading to a second attempt to repair the persistent leak. A high-triglyceride diet was prescribed for the patient 1-day prior to an open left thoracotomy to improve visualization of the leak. Intra-operatively, the previously repaired sites were intact, but there were several leaky points which were tackled by under-running the leaky channels. Again, the chylothorax improved only temporarily before it

recurred and worsened 2 days post-repair. Magnetic resonance imaging (MRI) of the thorax to search for the leak site/s causing persistent chylothorax only demonstrated bilateral pleural effusions without providing a clue as to the the potential site of injury. We performed Tc-99 m nanocolloid lymphoscintigraphy, which demonstrated normal kinetics of lymphatic flow from the pedal injection sites to the cisterna chyli. The propagation of tracer slowed down and the lymphatic channel delineation was hardly discernible beyond the cisterna chyli on planar images (Fig. 1a-b). However, SPECT/CT images acquired at 9 h post-injection revealed and depicted the sites of leakage into bilateral pleural spaces at the juncture where the thoracic duct courses obliquely, from the right hemithorax across to the left hemithorax. Leakage into the right pleural and left mediastinal pleural spaces were localized at the level of the inferior endplate and superior endplate of T6 vertebra, respectively (Fig. 1c-e). This prompted the surgeon to take a different approach from the previous two attempts. It was deemed too risky and potentially futile to further attempt to go after the leakage sites bilaterally. Hence, the surgeon performed a right thoracotomy to ligate the thoracic duct proximal to the leakage sites at the aortic hiatus. This successfully stopped the leak permanently. Planar lymphoscintigraphy lacks accurate anatomical depiction which SPECT-CT could offer. Conversely, anatomical imaging failed to locate the site of the leak. SPECT/CT lymphoscintigraphy overcomes the limitation of either imaging alone, and has been reported to be valuable in documenting and depicting sites of injury [1–3]. In this case, the SPECT-CT depiction and confirmation of bilateral leakage sites was pivotal in guiding the surgeon to take a

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Fig. 1 Planar lymphoscintigraphy images of the whole body (a) delineating the lymphatic channels in the lower limbs and pelvic region up to the cisterna chyli. The lymphatic channel beyond the cisterna chyli was not discernible (b). SPECT/CT lymphoscintigraphy images in

coronal and axial sections depicting the sites of bilateral leakage (white arrows) at the level of the inferior endplate and superior endplate of the T6 vertebra (c), into the right pleural (d) and left mediastinal pleural spaces (e), respectively

different approach and achieve a permanent solution to the persistent chylothorax.

Conflict of Interest Aini AbAziz, Syahrir M. Yusop, Mohd. Fadzil Mohd. Tahir, Yew Cheng Lim and Hans-Jurgen Gallowitsch declare that they have no conflicts of interest.

Ethical Statement All procedures followed were in accordance with ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from the patient for being included in this manuscript.

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