How-to-do-it

A new device for the identification of lymph nodes at lung cancer surgery

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Abstract

In order to provide a precise lymph node mapping during lung cancer surgery a sterilizable plastic tray moulded in the shape of the mediastinum and lungs is presented by the author. The device makes lymph node mapping simpler, safer, quicker and methodically more structured. A positive impact is expected as a result of usage of the device from making pathologist’s work easier and facilitating the flux of information on the surgeon—pathologist—oncologist—pneumonologist chain to be more disinformation-free.

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1. Introduction

Removal of a certain number of particular lymph nodes during lung cancer surgery is mandatory in order to obtain correct tumour staging [1]. Prognosis of the patient, decision for postoperative adjuvant therapy at individual level, audit at departmental level and any sort of scientific evaluation at institutional/national and international levels are unimaginable without proper TNM staging [2]. While there are pros and cons about its impact on the prognosis, and the optimal extent of the clearance remains a matter of discussion and personal preferences [3], the absolute need for the procedure is unquestionable [2]. An accuracy of 94—96% can be achieved by the sampling of lymph nodes from each of three N1 and three N2 stations (partial dissection or limited mediastinal lymph node dissection) as an alternative to complete mediastinal lymphadenectomy. (www.ctsnet.org/file/ESTS_guidelines_on_preop_nodal_staging_NSCLC.pdf).

There are several factors affecting the routine of individual surgeons practising lung cancer surgery, but it is clear that lymph node mapping is not as much integrated into the daily routine as it should be [4]. Problems with thoracic surgical training and individual attitudes are beyond our field. However, an extra attention and workload are definitely needed during lymph node collection on behalf of the surgeon and especially his/her assistant and the theatre staff, respectively. Again, the number and quality of the theatre crew are a potential source of misplacing and mishandling a great number of specimens. Necessary verbal instructions given in the course of sampling with reference to the individual specimens can also be distractive. Further communication between the personnel by the operating table and the circulating staff is another possible origin of misunderstandings. ‘Porter problems’ are frequently a neglected source of nuisance influencing seemingly unrelated areas like specimen transfer.

The time-consuming feature of the mapping is present at every level of handling the lymph nodes from their removal until they land at the table of the pathologist. Therefore, a simple tool seemed to be needed to solve as many of the problems as possible to achieve a safer and simpler procedure at collecting the lymph nodes.

2. Materials and method

A tray was made of plastics in accordance with the outline of the mediastinum and the lungs. The individual lymph node containers are also made of plastic material forming a built-in bottle with a water- (formaline) and airtight rubber cap (Fig. 1). The main structures such as the tracheobronchial tree, aorta, vena cava superior and inferior, vena azygos, the borders of the pulmonary lobes and their dividing fissures are also marked. The individual lymph node stations are marked in accordance with the ILCC standard. As the whole complex is sterile it can be handled by the surgeon him/herself or his/her assistant/scrub nurse at the time and place of the surgical removal of the lymph nodes without interfering with any other activities.

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Evaluation of the usage of the presented method was undertaken using interviews with the personnel concerned (two surgeons, four theatre nurses, three theatre assistants and two pathologists).

3. Results

The prototype of the tool was used in the past 11 months in 112 consecutive cases without any adverse event. It was applied during lung cancer surgeries and mediastinoscopies alike. Theatre staff preferred the tool. It became simpler to follow the Health and Safety Regulations as biohazard was obviously reduced. Pathologists were extremely pleased especially at the preparatory/identification stage of processing.

4. Conclusion

The device reduces movements around the operating table, as there is no need now for the separate step of giving the individual lymphnodes to the circulating staff for further handling. Unnecessary communication is reduced as there is no need to declare the different lymph nodes and their site of origin. Chances of misplacement, wrong or improper labelling of the specimens are obviously reduced, too. The quality of lymph nodes arriving at the pathologist is also expected to improve as tissue trauma during grasping/transferring is minimized. The risk of exposure to dangerous material (specimen, formalin) of the handling crew is also lower than by the use of individual vials/small bottles. And finally, there is an extra educational value of the device as it makes surgeons/assistants more ‘lymphnode staging aware’. Furthermore, methodically a more structured way of lymph node removal has become possible by using the tool presented.

All in all, the device makes lymph node collection and identification simpler, safer and quicker.

A further development is underway where the whole complex is industrially made as one plastic tray. The removable vials will completely be omitted and the lymph nodes put into designated bays and capped. This stage needs industrial backing and finance which is out of our reach.

References