USING A FAT SOLVENT TO DISSOLVE THE FAT IN ADIPOSE TISSUE FOLLOWED BY MECHANICAL REMOVAL OF THE SOLVENT / FAT MIXTURE (“ACETONE - COMPRESSION”).

WHY IT IS IMPORTANT AND HOW IT CONTRIBUTES TO IMPROVED LN HARVESTING.

The soft tissue surrounding most portions of the gastrointestinal tract is predominantly adipose tissue. The adipose tissue surrounds lymph nodes, arteries, veins, nerves and lymphatics. The adipose tissue itself is not usually of interest to a surgical pathologist; only the structures contained within the adipose tissue are important for histologic evaluation. Unfortunately, more than 90% of the volume of adipose tissue is fat cells. The sheer volume of the fat cells creates barriers to the efficient histologic evaluation of the structures contained in the adipose tissue. A new method to remove the barrier created by fat cells was first reported in the pathology literature in 2010.

Basten, et al (Pathologie , 2010) were the first to suggest a new process to improve the harvesting of lymph nodes from cancer excisions. A fat solvent (they used acetone) was used to elute (dissolve) the fat in adipose tissue. Basten introduced the term “acetone- compression”. After thorough soaking in the fat solvent, the adipose tissue was compressed in a simple, generic tissue press to expel the solvent/fat mixture. This decreased the volume of adipose tissue to 10% or less of the starting volume while retaining all of the lymph nodes and other structures without histologic distortion. The press used by Basten et al was inefficient because it was cumbersome to use and considerable “crumbling“ and trimming was required to place the compressed tissue into cassettes for histologic processing. But the process was very successful. They more than doubled their lymph node retrieval from a wide variety of cancer expression specimens from less than 20 lymph nodes to an average of 43.8 lymph nodes (with a range of 14 to 109). They dramatically demonstrated that manual palpation alone finds less than 50% of the lymph nodes that can be retrieved from cancer excisions.

Since Basten in 2010, there have been many reports on the process used by the Lymph Node Locator (but not the Lymph Node Locator itself). Gehoff et al (2012), Scheel et al (2015), Flynn et al(2019), and Quaas, et al (2020), along with Basten, have reported on over 850 specimens using a fat solvent for tissue volume reduction for improved lymph node harvesting. Lymph node yields consistently number 40 or more. The Lymph Node Locator by Omnia Inventa Medical has solved the problems associated with the mechanical device used by Basten. The Lymph Node Locator Is ergonomically easy to use and the device not only decreases tissue volume, it also

facilitates easy and rapid serial sectioning and easy cassetting of the serial sections. That is because the Lymph Node Locator sizes the defatted tissue to fit within a standard tissue cassette.

The process of using a fat solvent to dissolve the fat in adipose tissue followed by mechanical extraction of the solvent/fat mixture is now achievable in any laboratory. This process is ideal for :

neoadjuvant cases
efficient second look procedures
improving the evaluation of small (<5 mm) LNs below the palpation threshold
identifying tumor deposits
total embedding of all excised adipose tissue if necessary or required for a study
processing a portion of the adipose tissue to significantly improve lymph node totals.

NOTE: to ensure optimal Lymph Node Locator function and to decrease the need for cleaning of the device, strictly follow these instructions:

- **the adipose tissue should be cut into narrow strips and placed in a large volume of fat solvent to ensure maximal solvent penetration**

- **use only a proven and effective fat solvent like acetone or classic Carnoy's solution (with chloroform). Lymph node clearing / revealing solutions such as Reveal, O Fix, modified Carnoy's (without chloroform) are a combination of fixative and opacifier. <u>Revealing solutions will compromise LNL function, will lead to many more cassettes and a need for increased cleaning.</u>**

Journal articles reporting on the process of elution and fat extraction for tissue volume reduction and improved lymph node harvesting.

. Quaas, et al. Improved Tissue Processing in Esophageal Adenocarcinoma..... 2020.

https://link.springer.com/content/pdf/10.1245/s10434-020-09450-1.pdf

. Flynn, et al. Carnoy's solution fixation with compression..... (colorectal). 2019

https://pubmed.ncbi.nlm.nih.gov/30650183/

. Scheel, et al. Comprehensive LN morphometry in rectal CA using acetone compression. 2015

https://jcp.bmj.com/content/68/6/458

. Gehoff, et al. Optimal LN harvest in rectal cancer..... 2012

https://doi.org/10.1097/pas.0b013e31823fa35b

. Basten, et al. Acetone compression. A fast standardized method for investigation of GI lymph nodes. 2010

https://pubmed.ncbi.nlm.nih.gov/20012620/9

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