Increasing Lymph Node Recovery Through Automated Compressive Filtration Leads to Improved Confidence in Nodal Staging Score.

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Background

Lymph node (LN) recovery from gross examination and the correct analysis of LN status are necessary for accurate pathologic staging after colorectal cancer resection. Nodal Staging Score (NSS [Gonen et al. Journal of clinical Oncology 2009]) was developed to predict the probability that a patient is correctly staged as node negative. We evaluated whether Automated Compressive Filtration (ACF) of pericolic adipose tissue yields more LNs and increases the percent of cases achieving a high NSS.

Design

ACF was implemented as a supplementary LN grossing technique. After standard manual LN dissection, remnant adipose tissue was placed in acetone overnight (~15 hours). Fat was subsequently removed via ACF, which was performed with a Parker Isaac CY600 Adipose Tissue Separator (Ithaca, NY). The remnant tissue was entirely submitted for microscopic examination. Historical data and records were reviewed to establish historic LN yield. NSS was calculated as described by Gonen et al. (from 0 to 100 percent, with 100 representing 100% confidence in node negativity).

Results

Between 2016 and 2019, mean LN yield was 20 per case (n=302), resulting in only 40% of cases achieving an NSS of >95% and 84% of cases achieving an NSS of >90%. Thirty consecutive colorectal cancer resection specimens employed ACF. Initial grossing and manual dissection of those 30 cases yielded an average of 13 LN per case (range 6-40). Subsequent ACF of those 30 cases yielded an average of 18 additional LN per case (range 4-46). Average LN yield per case increased to 33 per case, resulting in 84% of cases achieving 95% NSS, and 96% of cases achieving 90% NSS (Figure 1). The average weight of the pericolic adipose tissue prior to ACF was 170 grams (range 37-417) and after ACF was 37 grams (range 6-112) representing an average 78% weight reduction. The average number of slides submitted from ACF was 17 (range 5-48). There were 2 instances of additional positive nodes recovered via ACF, one resulting in upstaging for the patient from a pN1a to pN1b.

Conclusion

This study demonstrates that ACF can significantly increase LN yields in colorectal cancer specimens and allow for a higher rate of adequate LN sampling. Consequently, use of ACF results in an increase in nodal staging confidence. Additionally, we demonstrate that this novel technique has the potential to result in upstaging compared to standard LN evaluation.