

High-Fat Diet in the Absence of Obesity Does Not Aggravate Surgically Induced Lymphoedema in Mice.

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Abstract

BACKGROUND:

Lymphoedema represents the cardinal manifestation of lymphatic dysfunction and is associated with expansion of the adipose tissue in the affected limb. In mice, high-fat diet (HFD)-induced obesity was associated with impaired collecting lymphatic vessel function, and adiposity aggravated surgery-induced lymphoedema in a mouse model. The aim of the current study was to investigate whether adiposity is necessary to impair lymphatic function or whether increased lipid exposure alone might be sufficient in a surgical lymphoedema model.

METHODS:

To investigate the role of increased lipid exposure in lymphoedema development we used a well-established mouse tail lymphoedema model. Female mice were subjected to a short-term (6 weeks) HFD, without development of obesity, before surgical induction of lymphedema. Lymphoedema was followed over a period of 6 weeks measuring oedema, evaluating tissue histology and lymphatic vascular function.

RESULTS:

HFD increased baseline angiogenesis and average lymphatic vessel size in comparison to the chow control group. Upon induction of lymphedema, HFD-treated mice did not exhibit aggravated oedema and no morphological differences were observed in the blood and lymphatic vasculature. Importantly, the levels of fibro-adipose tissue deposition were comparable between the 2 groups and lymphatic vessel function was not impaired as a result of the HFD. Although the net immune cell infiltration was comparable, the HFD group displayed an increased infiltration of macrophages, which exhibited an M2 polarization phenotype.

CONCLUSIONS:

These results indicate that increased adiposity rather than dietary influences determines predisposition to or severity of lymphedema.

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KEYWORDS:

High-fat diet; Lymphatic vessel function; Lymphoedema

PMID: 28301852 DOI: 10.1159/000461579[Index for MEDLINE]