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DYNAMIC 18F-FDG PET ACQUISITION IN LOCALLY ADVANCED BREAST CANCER

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BACKGROUND-AIM

Dynamic PET imaging can identify pattern of breast cancer metabolism and perfusion in particular in case of locally advanced disease (LABC). The aims of the study were: 1) to determine the most appropriate dynamic PET protocol in LABC; 2) to characterize the perfusion and metabolic patterns of different histologic type of LABC and 3) to determine the time to reach the highest uptake in the primary tumour.

METHODS

Twenty-four patients met the inclusion criteria, but only 16 were evaluated. The age of the enrolled women was ranged between 31 and 76 years. Tumour subtype was defined by immunohistochemistry. Subtype was defined as triple negative (no expression of estrogen, progesterone and HER2 receptors) and no-triple negative. Dynamic PET was elaborated by using two different protocols, named Dynamic Image I (2x30sec, 12x10sec, 6x20sec, 5x60sec and 8x300sec) and Dynamic Blood Flow (12x10sec, 12x480sec and 8x300sec). Moreover the retention index (RI) was calculated according to the following formula: $[\text{count rate (early)} - \text{count rate (late)}] / \text{count rate (early)} \times 100$. The time-activity curves (TACs) were computed for each histologic type.

RESULTS

Both for Dynamic 1 and Dynamic blood flow protocol, the TACs of BC demonstrated a steady state of tracer until 480 sec from the injection. The Dynamic 1 protocol was more accurate than Dynamic blood flow one in differentiating the perfusion from metabolic patterns. In triple negative BC, the peak of uptake was registered after 60 min from the injection, while in no-triple negative subtype a similar maximum uptake was demonstrated after 50min from the injection. No difference between 60 and 120 min from the injection was evident for both subtypes of BC. The RIs for triple negative and no triple negative BC in accordance with the protocols were: 55.2% versus 66.7% and 62% versus 62%, respectively for Dynamic-1 and Blood-Flow one.

CONCLUSION

In triple negative BC, a 60-min whole-body PET acquisition is advised. Conversely in no-triple negative patients a 50-min whole-body PET acquisition could be performed, thus recovering the time of one patient every 5 acquired subjects.