BC Cancer Guidelines for FDG-PET/CT Imaging in Pediatric Oncology Patients

Lymphoma (Hodgkin's Disease and Non-Hodgkin Lymphoma)

1. Baseline staging to evaluate the extent of disease.
2. Interim scan to assess early disease response to chemotherapy. In Hodgkin's lymphoma this will occur after 2 cycles of standard chemotherapy. This may not be required for NHL.
3. End of treatment to assess disease response and plan further management.
4. Clinical concern of relapse.

Leukaemia

1. Assessment for extramedullary disease in patients with Acute Myeloid Leukaemia.

Sarcomas of Soft Tissue

1. Baseline staging to evaluate for metastatic sites of disease.
2. End of treatment response assessment may be considered for FDG avid tumours.
3. Clinical suspicion of relapse.
4. CT chest more sensitive to evaluate for pulmonary metastases.

Sarcomas of Bones

1. Baseline staging to evaluate for metastatic sites of disease.
2. End of induction therapy imaging may be appropriate to evaluate disease prior to local control.
3. End of treatment response assessment.
4. Clinical suspicion of relapse.
5. CT chest more sensitive to evaluate for pulmonary metastases.

Malignant Peripheral Nerve Sheath Tumours in Patients with Neurofibromatosis – Type 1

1. FDG PET/CT has a high negative predictive value for the malignant transformation of plexiform neurofibromata in patients with NF1.
2. Imaging is acquired after a 1 hour uptake phase and may be supplemented by a delayed image after 4 hours, at the discretion of the attending physician.

Neuroblastoma

1. FDG PET/CT is useful to evaluate disease sites in patients with MIBG negative tumours.
2. FDG PET/CT may be used to evaluate disease in patients with MIBG positive disease sites that become MIBG negative during treatment.
3. Due to the high sensitivity but lower specificity of FDG compared with MIBG, a biopsy may be required to confirm disease in soft tissue or bone lesions that are FDG avid.
4. Ga-DOTATATE is an alternative radiopharmaceutical that can be used to evaluate neuroblastoma.

Wilm's Tumour

1. Baseline staging may be considered.
2. Disease response assessment may be considered.
3. Most evidence suggests role of FDG is to evaluate disease at relapse.

Germ Cell Tumour

1. Baseline staging to evaluate for metastatic sites of disease.
2. To evaluate response to therapy.
3. To evaluate clinically suspected disease relapse.

Hepatoblastoma

1. Baseline staging may be considered.
2. Disease response assessment may be considered if disease is FDG avid at presentation.

Langerhan's Cell Histiocytosis (LCH)

1. FDG PET/CT provides whole body evaluation of disease at baseline and classifies into single system or multisystem involvement to direct further management.
2. Assess response to therapy.

Hemophagocytic Lymphohistiocytosis (HLH)

1. FDG PET/CT may be appropriate during workup to guide biopsy and rule out malignancy.

Brain Tumours

1. FDG PET/CT may be appropriate to assess histological grade of tumour.
2. FDG PET/CT may help to distinguish tumour recurrence from radiation necrosis.

Head and Neck Tumours

1. Baseline staging of head and neck malignancies including nasopharyngeal carcinoma and salivary gland tumours.
2. Assessment response to treatment in FDG avid disease.

Thyroid Cancer

1. FDG PET/CT may be considered in patients with clinical concerns and aa negative iodine scan to direct further management

Carcinoma of Unknown Primary

1. FDG PET/CT may be used to evaluate for possible malignancy in a patient with a concerning clinical presentation as directed by the appropriate clinical team.

Evidence-based Literature to Support the Indications

1. SNMMI procedure standard/ EANM practice guideline on pediatric 18F-FDG PET/CT for oncology 1.0. Vali R et al. JNM(2021)62;1:99-110
2. Evidence-based indications for the use of PET-CT in the UK 2022