Diagnostic value of PET/CT for the staging and restaging of pediatric tumors.

OBJECTIVE: The objective of this retrospective study was to compare the diagnostic value of 2-[18F]fluoro-2-deoxy-D-glucose positron emission tomography ((18)F-FDG PET)/CT versus (18)F-FDG PET and CT alone for staging and restaging of pediatric solid tumors. METHODS: Forty-three children and adolescents (19 females and 24 males; mean age, 15.2 years; age range, 6-20 years) with osteosarcoma (n = 1), squamous cell carcinoma (n = 1), synovial sarcoma (n = 2), germ cell tumor (n = 2), neuroblastoma (n = 2), desmoid tumor (n = 2), melanoma (n = 3), rhabdomyosarcoma (n = 5), Hodgkin's lymphoma (n = 7), non-Hodgkin-lymphoma (n = 9), and Ewing's sarcoma (n = 9) who had undergone (18)F-FDG PET/CT imaging for primary staging or follow-up of metastases were included in this study. The presence, location, and size of primary tumors was determined separately for PET/CT, PET, and CT by two experienced reviewers. The diagnosis of the primary tumor was confirmed by histopathology. The presence or absence of metastases was confirmed by histopathology (n = 62) or clinical and imaging follow-up (n = 238). RESULTS: The sensitivities for the detection of solid primary tumors using integrated (18)F-FDG PET/CT (95%), (18)F-FDG PET alone (73%), and CT alone (93%) were not significantly
different (p> 0.05). Seventeen patients showed a total of 153 distant metastases. Integrated PET/CT had a significantly higher sensitivity for the detection of these metastases (91%) than PET alone (37%; p 0.05). When lesions with a diameter of less than 0.5 cm were excluded, PET/CT (89%) showed a significantly higher specificity compared to PET (45%; p 0.05). CONCLUSION: Our study showed a significantly increased sensitivity of PET/CT over that of PET for the detection of distant metastases but not over that of CT alone. However, the specificity of PET/CT for the characterization of pulmonary metastases with a diameter> 0.5 cm and lymph node metastases with a diameter of<1 cm was significantly increased over that of CT alone.

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