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Comparative Study Between 99mTc-MDP Bone Scintigraphy and 18F-FDG PET/CT in the Staging of Adolescent Osteosarcoma: A Case Series

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Abstract

Background: Children and adolescents primarily develop osteosarcoma, the most common malignant primary bone tumor. Adequate first-time staging is important to sustain the appropriate treatment and estimate prognosis. Bone scintigraphy with 18F-FDG, and those of 99mTc-MDP, have each been separately documented to evaluate the degree of skeletal involvement and metastatic spread. The difference in the contribution of these modalities is documented to some extent.

Objective: This study hopes to outline and document the differences between 99mTc-MDP bone scintigraphy and 18F-FDG PET/CT in the first staging of osteosarcoma on adolescents.

Methods: The study was focused on four identified cases of osteosarcoma treated at Cheikh Khalifa International University Hospital. A retrospective descriptive case series becomes applicable. Each of the four studied cases was subjected to 99mTc-MDP bone scintigraphy and 18F-FDG PET/CT. Standard clinical procedures were adhered to. The imaging findings were assessed for primary tumor, reference to local and regional extension, and distant metastasis.

Results: Osteosarcoma lesions were identified by bone scintigraphy. PET/CT was documented to be better in assessing local extension and soft tissue as well as in the distant metastatic lesion evaluation. In 2 of the studied cases, bone scintigraphy failed to detect lesions, and PET/CT documented evidence of metastatic lesions. In each of the 2 cases discrepancy was documented, the additional information from the PET/CT may influence the course of the treatment.

Conclusion: Osteosarcoma of adolescents is best documented and evaluated by the combined use of both radiation modalities in the early staging and treatment processes.

Keywords: Osteosarcoma; PET/CT; 18F-FDG; Bone Scintigraphy; 99mTc-MDP; Pediatric Oncology; Nuclear Medicine.

1. Introduction

Osteosarcoma is the leading primitive neoplasm of bone affecting the pediatric population and represents around 20% of world malignant bone tumors. It mainly occurs during the phase of rapid skeletal growth and represents a significant cause of morbidity and mortality of devasting disease in children (Steliarova-Foucher et al., 2017; Quartuccio et al., 2021). While there is continuous improvement in the path of combined treatment, comprising of chemotherapy and adjuvant treatment, and targeted treatment, the accuracy of the staging at the outset continues to be important in the planning of treatment and in the ultimate outcome of the patient (Isakoff et al., 2015; Harrison et al., 2024).

Imaging is an integral step in the process of diagnosing and staging osteosarcoma. Radiography, CT, MRI, bone scintigraphy, and PET/CT provide important information and varying details of tumor characteristics, local invasion, and metastatic spread (Wuisman et al., 2018; ESMO, 2023). Accurate determination of the disease at the outset is important as the presence of metastasis severely impacts prognosis and the treatment ultimately bestowed.

Among the imaging techniques of nuclear medicine, 99mTc-MDP bone scintigraphy has been the standard for whole body imaging of the skeletal system. Because of its sensitivity to increased osteoblastic activity, bone scintigraphy is the work horse of tumor staging of skeletal metastasis and of primary bone tumors (Even-Sapir et al., 2017). However, the advent of new imaging techniques of a molecular nature has focused on the combination of imaging techniques that provide, in a single imaging study, both metabolic and morphologic information.

The use of 18F-FDG PET/CT has changed the landscape of imaging in osteosarcoma, as it provides the ability to assess tumor metabolism, local extent, and distant metastasis in a single study.

Several studies and meta-analyses have shown that PET/CT scans are more effective at identifying occult metastases than other imaging methods, especially with pulmonary and extra-skeletal lesions (Xu et al., 2020; Quartuccio et al., 2021). Additionally, PET/CT scans allow for the use of metabolic parameters, including standardized uptake values (SUVs) which are indicative of tumor aggressiveness, treatment, and prognosis and can provide information about other elements regarding the tumor at different stages of the disease (Benz et al., 2021; Liu et al., 2023).

PET/CT scans are further enhanced in diagnostic value by the recent advances of AI, radiomics, and imaging techniques that allow for the quantification of PET in musculoskeletal oncology. Some studies show that lesion characterization, work-up and evaluation of lesion risk in osteosarcoma, and the potential for creation of individualized treatment plans are possible with advanced image analysis techniques (Harrison et al., 2024; Wang et al., 2025).

The focus of this study is on the comparison of the 18F-FDG PET/CT scans and the 99mTc-MDP bone scintigraphy scans in the diagnostic work-up of newly diagnosed osteosarcoma in adolescents. The study will illustrate the value of each of the imaging techniques in the assessment of the primary tumor, the extent of disease locally and regionally, and the overall metastatic work-up.

2. Case Presentation

Case 1

A 26-year-old patient was diagnosed with osteosarcoma of the hip, after the pathology examination was performed for the complaint of painful right hip. Progressive impairment of function was an additional symptom for which the patient sought medical attention.

Bone scintigraphy was performed with 99mTc-MDP. The results showed extensive involvement of the right hip region by the primary tumor. There were no signs of distant bone metastases.

The next examination with 18F-FDG PET/CT showed that the right coxofemoral tumor was primary and hypermetabolic with a significant extent of tumor growth to surrounding soft tissues. Distant metastases were not seen in this examination also.

Both imaging methods were able to demonstrate the primary tumor; however, PET/CT was superior in demonstrating the extent of the primary tumor and soft tissue involvement.

Case 2

The patient was 26 years old and was referred to the PET/CT examination for the initial staging of confirmed osteosarcoma of the proximal third of the right tibia.

Bone scintigraphy showed the primary tumor of the right tibia with no signs of skeletal metastases. 18F-FDG PET/CT in this patient revealed a primary osteosarcoma of the right leg which was hypermetabolic, as well as a hypermetabolic pulmonary

nodule in the lower left lobe which was not visible on the bone scintigraphy and was regarded as a likely metastatic focus.

This patient illustrates the importance of utilizing 18F-FDG PET/CT for initial staging and to establish the presence of pulmonary metastases that may alter the course of therapy and the outcome of the patient.

Case 3

The patient was 17 years old and had pain and swelling of the distal femur. Histological studies confirmed the diagnosis of conventional osteosarcoma.

In the scintigraphy studies, the primary tumor was found to be highly osteoblastic, and there was active osteoblastic activity. Scintigraphy showed possible local extension of the tumor with no signs of distant metastases.

The primary tumor was found to be highly active and extended to the adjacent soft tissues. Additional skeletal lesions demonstrated osteoblastic activity and were considered to be metastases. These lesions were not appreciated on the bone scan.

The studies confirmed that PET/CT was the most sensitive technique for evaluating the primary tumor and its local extension, and the most sensitive technique for detecting metastases.

Case 4

A 6-year-old child with new limb pain and localized swelling was suspected of having osteosarcoma. Bone scintigraphy was positive for the primary osteoblastic lesion with no distant metastases.

The primary lesion was confirmed on 18F-FDG PET/CT with local extension. Further extension and metabolic changes, which were not detected by scintigraphy, suggested early metastases.

The findings of the PET/CT were instrumental in further assessment and planning for therapy.

Comparative Summary of the Four Cases

Bone scans in all four cases showed primary osteosarcoma lesions. PET/CT was superior in assessing tumor metabolism, soft tissue involvement, and distant metastases. PET/CT in two of the four cases documented metastases which were not detected by scintigraphy. These observations indicate that both imaging modalities play complementary roles, and that during initial staging, PET/CT may be even more sensitive to detecting occult metastatic involvement.

3. Comparative Results

The comparison of the four osteosarcoma cases proved that all patients had the primary tumor lesion identified by 99mTc-MDP bone scintigraphy and 18F-FDG PET/CT. Hence, there was a 100% detection rate of primary lesions by both imaging techniques. As a result of these findings, not only has the utility of bone scintigraphy for identification of primary skeletal lesions been reaffirmed, but the role of PET/CT in identification of the metabolically active osteosarcoma lesions has also been established.

Table 1. Comparative Findings of the Four Osteosarcoma Cases

Case	Age (Years)	Primary Tumor Location	Bone Scintigraphy Findings (99mTc-MDP)	18F-FDG PET/CT Findings	Additional Information Provided by PET/CT
Case 1	26	Right coxofemoral region	Intense radiotracer uptake corresponding to the primary lesion. No distant metastases detected.	Hypermetabolic coxofemoral mass with precise delineation of loco-regional extension and adjacent soft tissue involvement.	Improved assessment of local tumor extension and metabolic activity.
Case 2	26	Proximal right tibia	Intense uptake of the primary tibial lesion. No metastatic lesions identified.	Hypermetabolic tibial lesion associated with a hypermetabolic pulmonary nodule in the left lower lobe.	Detection of pulmonary metastatic disease not visualized on bone scintigraphy.
Case 3	17	Distal femur	Primary lesion identified with evidence of local skeletal involvement. No distant metastases detected.	Hypermetabolic primary lesion with soft tissue invasion and additional skeletal metastatic lesions.	Detection of occult bone metastases and more accurate loco-regional evaluation.
Case 4	6	Lower limb long bone	Primary lesion identified with increased osteoblastic activity. No distant metastatic lesions detected.	Hypermetabolic primary lesion with suspicious metastatic foci and better characterization of tumor extent.	Enhanced assessment of metastatic spread and tumor burden.

Overall Findings	Mean age: 18.75	—	Primary tumor detected in all 4 patients (100%). No distant metastases identified.	Primary tumor detected in all 4 patients (100%). Metastatic disease detected in 2 patients.	Additional clinically relevant findings identified in 2 of 4 patients (50%).

Abbreviations: PET/CT = Positron Emission Tomography/Computed Tomography; FDG = Fluorodeoxyglucose; MDP = Methylene Diphosphonate.

While both imaging modalities are comparable in identifying the primary tumor, they differ in their ability to assess loco-regional extension. While bone scintigraphy reported probable loco-regional extension in three out of four patients, PET/CT reported localized tumor extension in all cases. Due to the integration of anatomic and metabolic imaging in the PET/CT system, the invasion of the primary tumor into the surrounding soft tissues was better delineated. This stretch of soft tissue is an essential component in determining the appropriateness and strategy of the surgical intervention and the subsequent treatment.

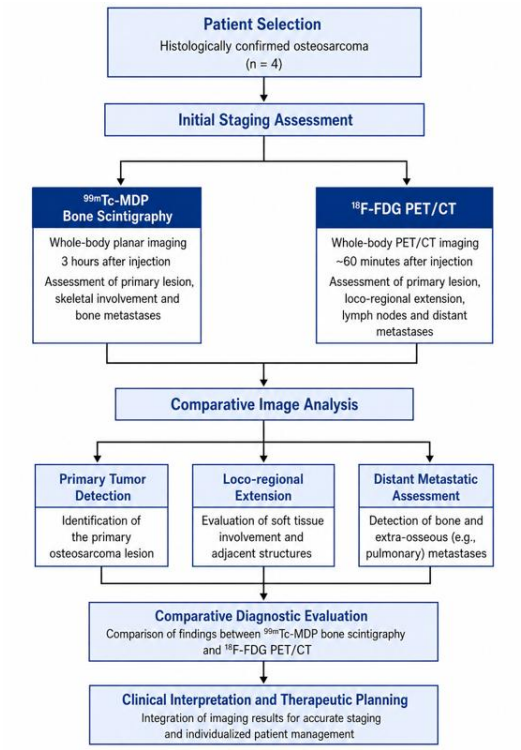

Figure 1. Study Design Illustrating the Comparative Assessment of 99mTc-MDP Bone Scintigraphy and 18F-FDG PET/CT in Osteosarcoma Patients

The evaluation of distant metastatic disease revealed the most notable differentiation between the two imaging techniques. Bone scintigraphy was unable to demonstrate any distant metastatic disease in the study population, while PET/CT identified metastatic disease in two individuals. One of the patients had a metastatic pulmonary lesion which was identified by PET/CT alone. Additionally, one of the other patients had multiple skeletal metastatic lesions which were not detected by bone scintigraphy. From these findings, it appears that, during the initial staging of osteosarcoma, occult metastatic disease may be more readily identified by PET/CT than by bone scintigraphy.

Discrepant findings were noted in two of the four cases. Bone scintigraphy, in these two cases, failed to detect the presence of distant metastatic disease and the extension of the tumor beyond the confines of the skeleton, which were both revealed by PET/CT. In these two cases, the limitations of bone scintigraphy are evident, particularly with the assessment of soft tissue and non-skeletal metastatic disease.

PET/CT also aids in the assessment of the metabolic status of a lesion and the presence of disease. The uptake of FDG in both primary and metastatic lesions suggest the more aggressive nature of the disease and aids in the assessment of the metabolic burden of the disease. This may prove helpful in the development of more individualized treatment protocols.

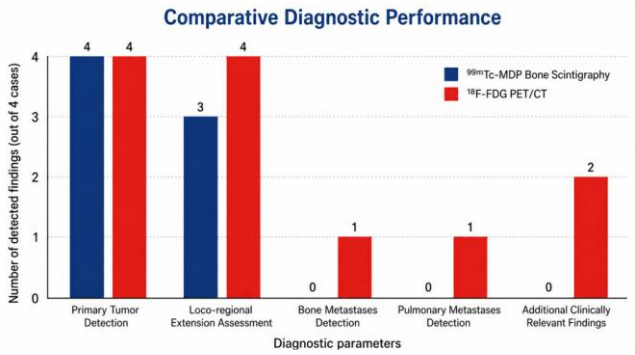

Figure 2. Comparative Diagnostic Performance of 99mTc-MDP Bone Scintigraphy and 18F-FDG PET/CT in the Initial Staging of Osteosarcoma

The primary conclusion that can be drawn from the research as a whole is that the two methods of imaging in consideration should be thought of as complementary methods that work in union rather than competing methods that work in exclusion to one another. For the time being, Bone Scintigraphy is still a good option for the imaging of primary lesions in the skeleton, as well as the assessment of the total involvement of the skeleton. Because of the additional diagnostic information pertaining to local and regional advancement and the metabolism of the reasonably distant bone metastases, which

may have a great impact on the clinical management, PET/CT is more advanced compared to Bone Scintigraphy.

When both imaging methods were used in conjunction, a comprehensive staging evaluation was achieved. From the imaging methods employed in this case series, PET/CT was the most useful in 50% of the patients. This gives credence to the use of PET/CT as a complementary imaging method for the assessment of osteosarcoma in the earlier stages. This is also in agreement with earlier research, which has shown that in the assessment of skeletal metastases, as well as the extensive local and regional extension of Osteosarcoma, PET/CT has a greater advantage.

The use of both imaging methods has shown complementary advantages, despite the small case numbers. The use of complementary imaging methods in the assessment of osteosarcoma should be investigated with the use of larger imaging studies in the future in order to determine the specific value of each imaging metho.

4. Discussion

For patients diagnosed with osteosarcoma, accurate imaging and staging are crucial, as the presence and extent of disease at the time of diagnosis will impact treatment options as well as the predicted clinical outcome. Currently, there is no single imaging modality or technique that is sufficient for identifying the primary osteosarcoma tumor, assessing its loco-regional extension, and determining the presence of distant metastases. Recently, attention has been given to the relative advantages and disadvantages of the various imaging modalities used in nuclear medicine, particularly in comparing conventional bone scintigraphy and 18F-FDG PET/CT. The present case series add to the existing literature by demonstrating the complementary nature of these two imaging modalities (Quartuccio et al., 2021; Harrison et al., 2024).

Within this series, both imaging techniques (99mTc-MDP bone scintigraphy and 18F-FDG PET/CT) identified the primary osteosarcoma in all four patients. Recent studies have only reported on the sensitivity of bone scintigraphy in identifying osteoblastic activity within primary osteosarcoma (Quartuccio et al., 2021). Due to its availability, low cost, and capability of providing whole body imaging, bone scintigraphy remains the most utilized method of imaging. The radiotracer 99mTc-MDP deposits within regions of increased osteoblastic activity and bone remodeling, and is therefore useful in imaging primary bone tumors as well as other skeletal pathologic conditions (Even-Sapir et al., 2017; ESMO, 2023).

Although bone scintigraphy performed excellently in the identification of the primary osteosarcoma lesions, the ascertainment of loco-regional tumor extension was better executed by PET/CT. For all four patients, PET/CT studies assessed the primary lesions and provided information on the metabolic activity of the lesions, as well as the adjacent soft tissues.

These findings are corroborated by new research that indicates FDG uptake correlates with the aggressiveness of neoplasms, cell proliferation, response to treatment, and histological grading (Liu et al., 2023; Benz et al., 2021). The combined metabolic and anatomic information afforded by PET/CT may help clinicians determine the extent of the tumor and possibly assist with the optimization of the surgical approach.

An observation of great significance is the detection of metastasis. No metastasis was seen in any patient with bone scintigraphy. However, in two patients, PET/CT demonstrated previously undetected metastatic disease. One patient had metastasis to the lung, and the other had additional metastatic lesions in the bones which were not seen in the bone scintigraphy. These findings also support the recently published meta-analyses which note that for the assessment of metastatic osteosarcoma, PET/CT is more sensitive than traditional bone scintigraphy (Xu et al., 2020; Quartuccio et al., 2021).

The detection of metastatic disease to the lung is an important finding of this study. The metastasis to the lung is not only the most common metastasis of osteosarcoma, but it is also one of the most important factors in affecting the prognosis of the patient (Isakoff et al., 2015; Harrison et al., 2024). Since bone scintigraphy primarily assesses osteoblastic activity in the bones, the detection of metastasis in other organs is of limited scope, due to the nature of the study. PET/CT, however, provides the opportunity of whole-body metabolic imaging, and may greatly enhance the assessment of the disease both in bones and in other organ systems. PET/CT may ensure accurate staging of the disease and the assessment of the prognosis.

Another important feature of PET/CT is that it can assess the biology of the tumor. FDG uptake highlights the areas of the body where malignant cells are metabolically active and has the potential to provide insights beyond anatomical mapping. In osteosarcoma, elevated SUVs have been linked to more aggressive tumors, adverse treatment outcomes, and poor overall survival (Liu et al., 2023; Benz et al., 2021). Consequently, while PET/CT aids in the staging process, it has the potential to provide prognostic insights that may impact the selection of treatment.

Particularly important is the synergistic nature of the imaging techniques. In spite of the soft tissue appraisal potential and improved ability of PET/CT to identify distant metastases, the assessment of skeletal metastases is still the domain of bone scintigraphy. It has been recently postulated that diagnostic accuracy may be enhanced with PET/CT and bone scintigraphy by incorporating metabolic and scintigraphy (osteoblastic) data (Quartuccio et al., 2021; Xu et al., 2020). The current study adds credence to this hypothesis.

The ready availability of PET/CT has resulted in some researchers proposing the potential elimination of bone scintigraphy from the standard staging protocol for osteosarcoma. The relative advantages of PET/CT notwithstanding, the economics, availability of equipment, and the organization of health services continue to dictate imaging methods in most medical facilities. In the World Health Organization's (2023) ranking of countries based on economic development, the availability of PET/CT is limited when compared to bone scintigraphy. Hence, the latter has justified inclusion, and will continue to be, in clinical practice.

The present study has a number of shortcomings which are evident.

First, the sample size of four patients limits the ability to conduct formal statistics on the data and makes the findings less applicable to the larger population. Second, the retrospective nature of the study introduces bias in the selection of patients and lessens the available follow-up information. Third, some metastatic lesions did not have histopathological verification. Regardless of these concerns, the study does describe some clinical observations and uses the recent literature to support the use of PET/CT in staging osteosarcoma.

Subsequent studies should be larger and utilize a greater number of patients. There should be prospective studies as well to outline the imaging technique for staging osteosarcoma when comparing PET/CT to the existing techniques of bone scintigraphy, MRI, and other imaging techniques that are in the process of being developed. Additionally, AI, radiomics, and machine learning may be helpful in lesion detection and provide more personalized diagnostics in the future (Wang et al., 2025; Harrison et al., 2024).

Ultimately, this case series illustrates the body of evidence that supports that the use of 18F-FDG PET/CT provides staging that is more complete and allows for the better management of patients compared to traditional bone scintigraphy. While both techniques are useful, PET/CT is superior in the assessment of the disease in the region and in the detection of metastatic disease which is an improvement to the management of patients with osteosarcoma.

5. Clinical Implications

This study has clinically relevant findings that will aid the management of patients with osteosarcoma. Firstly, this study confirms that primary osteosarcoma lesions can be identified using both 99mTc-MDP bone scintigraphy and 18F-FDG PET/CT. Thus, either imaging modality can be used for the primary diagnostic investigations in patients with suspected malignant bone tumors (Quartuccio et al., 2021; ESMO, 2023).

Secondly, PET/CT's ability to better assess loco-regional extension may aid in the surgical protocol by indicating the boundary of the tumor and extension of the tumor to the surrounding soft tissues. This will determine the best approach to limit the extent of the surgical procedure while achieving the goal of limb preservation. (Harrison et al., 2024; Liu et al., 2023).

Third, planning of the treatment will be affected by the ability of PET/CT to assess the presence of hidden metastases. If the lung or bone metastases are found when the tumor is first diagnosed, the tumor will be classified differently, and this will lead to a change in the type of chemotherapy and surgical procedures that will be carried out. This is of great importance, because there is a significant difference in prognosis when osteosarcoma is either localized or when it is metastasized (Xu et al., 2020; Harrison et al., 2024). It has been shown that PET/CT has the ability to detect metastases that conventional imaging fails to, thus improving the accuracy of the stage and enabling the selection of appropriate treatment (Quartuccio et al., 2021). PET/CT, due to its ability to assess tumor activity, also enables the optimization of treatment for the individual patient.

In osteosarcoma patients, parameters from quantitative PET such as maximum standardized uptake value (SUVmax), metabolic tumor volume (MTV), total lesion glycolysis (TLG), and other metabolic biomarkers have been shown to correlate with tumor metabolism, aggressiveness, response to therapy, and prognosis (Liu et al., 2023; Benz et al., 2021). These metabolic markers can offer a foundation for more individualized therapy and also enhance the monitoring of therapeutic changes during the patient follow-up.

One of the emerging opportunities of incorporating precision medicine in musculoskeletal oncology is the coupling of advanced radiomics with artificial intelligence (AI) analytical

tools to enhance the risk/benefit assessment. Preliminary studies have demonstrated the potential of AI in imaging to improve lesion characterization and predictive modeling of therapeutic outcomes (Wang et al., 2025; Hosny et al., 2022).

The findings also provide support for the utilization of a complementary imaging approach with the availability of bone scintigraphy, and PET/CT depending on clinical need and available resources. Although PET/CT is superior in multiple facets of the diagnostic imaging of staging, there is a role for bone scintigraphy as a widely available and less expensive imaging technique. For health systems with less advanced imaging resources, the combination of both imaging techniques may provide the largest benefit (World Health Organization, 2023; ESMO, 2023).

The study findings also promote the emerging role of PET/CT in the management of osteosarcoma while also promoting the role of bone scintigraphy. The combined imaging techniques are anticipated to provide the necessary foundation for the staging of osteosarcoma and the subsequent personalized therapy, which will improve the outcomes of these patients.

6. Limitations

The limitations of the present study should be considered when interpreting the findings. First, the study had a small sample size consisting of four patients with histologically proven osteosarcoma. Although this reflects the rarity of the condition and the preliminary nature of the study, it does limit the degree to which results can be generalized and the statistical analyses that can be conducted. Therefore, the results should be interpreted as descriptive and not as conclusive.

Second, the study employed a retrospective design, which, of course, introduces bias due to the selective nature of data collection. In this case, data were obtained from existing medical records and imaging. This meant that the investigators had no or limited control over patient selection or the imaging and clinical protocols. Studies of a prospective nature would allow the investigators to control more of the data collection process and provide more conclusive evidence of the relative performance of the imaging modalities in question.

Third, the study was conducted at a single center. In that case, it is most likely that the results would not be valid outside of this center. In this case, it is possible that the imaging and diagnostics methods, as well as the clinical methods employed, would be different from other centers. The use of multiple centers in a study would likely improve the validity of the study.

Another limitation is the lack of histopathological verification of the metastatic lesions imaged and had not had a biopsy performed. In practice, this is often impractical and it is often deemed unethical to biopsy every metastatic lesion. Therefore, it is possible that many of the imaging findings may not be confirmed. Though this reflects practice, it introduces uncertainty from a diagnostics' perspective.

This study is limited in other ways as well. This study did not consider the imaging of multiple modalities to evaluate the progression of osteosarcoma once it is determined, nor did it consider the imaging of multiple modalities in the follow up of patients with osteosarcoma once imaging is performed. These issues are imperative aspects of clinical interest that require more attention in future studies.

Lastly, considerations of economics and evaluations of cost-effectiveness were outside the scope of this study. Although several aspects of disease assessment showed that PET/CT had the edge in diagnosis, its availability and cost are barriers for many health care systems. Future studies will need to address these issues, in particular, the costs associated with the different imaging methods used in the diagnosis of osteosarcoma.

This study has several limitations, but the roles of 99mTc-MDP bone scintigraphy and 18F-FDG PET/CT in the diagnosis and staging of osteosarcoma have been clearly demonstrated. These findings are in line with the previous studies and add more evidence in the area of malignant bone tumors and the use of advanced imaging techniques.

7. Conclusion

Accurate osteosarcoma staging is critical for understanding prognosis and for developing an appropriate treatment plan. This study analyzed four cases to evaluate and compare the diagnostic value of each of the two imaging techniques: 18F-FDG PET/CT and 99mTc-MDP bone scintigraphy. The study demonstrated the pivotal role of each imaging technique in the staging of osteosarcoma.

It was found that bone scintigraphy and PET/CT imaged the primary tumor in all patients. However, PET/CT was able to provide additional and important information about the local and regional tumor extension and the presence of metastasis. PET/CT, in fact, imaged metastatic lesions of lung and bone that were not imaged by bone scintigraphy, proving the former to be the technique of choice for evaluating the presence of metastasis.

PET/CT, due to its hybrid imaging capability, is able to provide both the metabolic and anatomical evaluation of osteosarcoma and of the potential existence of extensive metastasis. This information may greatly influence the treatment and surgical plan, and even the prognosis of the patient. While bone scintigraphy is not a hybrid imaging technique, it remains a critical and highly accessible option for imaging of the primary osteosarcoma and for the evaluation of the extent of metastasis.

The observed diagnostic value of the two imaging techniques should not be viewed as competing; in fact, it demonstrates their complementary value for osteosarcoma staging. The integration of the skeletal evaluation of bone scintigraphy with the metabolic assessment of PET/CT may lead to more comprehensive and accurate staging of osteosarcoma.

While this study has a small sample size, the findings are congruent with what is already found in the literature regarding the role of PET/CT in imaging potential osteosarcomas. Future multicenter investigative studies, specifically prospective ones, using larger patient populations, must define the roles of these imaging technologies. They also must create a basis for the imaging protocols used for the staging and management of osteosarcoma patients.

In conclusion, 99mTc-MDP bone scintigraphy is an important imaging technique for the detection of primary skeletal lesions. However, 18F-FDG PET/CT provides better visualization and understanding of the extent of loco-regional lesions and distant metastases. The use of these two imaging modalities provides better metastasis staging in osteosarcoma and thus optimizes the management of patients.

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