Mediterranean Thematic Workshops in Advanced Molecular Imaging

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Comparison between three-phase bone scan and 99mTc-HMPAO-labelled white blood cell scintigraphy in patients with suspicious of hip or knee prosthetic infected loosening

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Prosthetic joint infection (PJI) is one of the worst complications after primary implant and revision. The differential diagnosis between septic or aseptic loosening is sometimes very difficult especially in a low-grade infection. Three-phase bone scan with 99mTc-hydroxymethylene diphosphonate (3phase-BS) and 99mTc-Hexamethylpropylene amine oxime (HMPAO) white blood cell scintigraphy (WBC) are frequently used to evaluate patients (pts) with painful prosthesis. We retrospectively assessed their respective role in 92 pts (53 women, 39 men) with suspected late (>24 months) PJI (25 hip; 67 knee). All patients performed 3phase-BS and WBC within 2 weeks. The final diagnosis was based on microbiological culture after arthrocentesis or sampling during single-stage prosthesis explantation or by clinical follow-up for at least 12 months. 3phase-BS was positive in all pts. WBC was negative for PJI in 66 pts: no accumulation of WBC over time was seen in periprosthetic regions in 17/66 pts, a stable or decreasing accumulation of labeled white blood cell over time was seen in 49/66 pts; WBC was positive for PJI in 26 pts, showing a WBC accumulation increasing over time in prosthetic and/or periprosthetic regions. Our results showed that a positive 3phase-BS does not allow to make a certain diagnosis. 66/92 pts without infection showed, in fact, inflammation/infection signs at 3phase-BS (false positive results) and negative findings at WBC (true negative results). In conclusion, positive 3phase-BS can often mislead for a correct diagnosis and needs always to further investigation to reach the differential diagnosis between septic and aseptic loosening of PJ. WBC showed very high diagnostic accuracy allowing to identify the presence or absence of infection. WBC confirmed its important role in the diagnostic algorithm of prosthetic joint infections.

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