Overview on Inflammation/Infection and Standardized Cell Labelling Procedure

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Any organ of the human body can be affected by an infectious disease. If there is no prompt diagnosis and therapy a localized infectious disease can develop into a systemic infective condition, due to the haematogenous spread of microrganisms. Since many years the Nuclear Medicine is leading the field of imaging infection and/or inflammationthrough the possibility to use different radiopharmaceuticals according to the clinical condition of the patient. Autologous labelled white blood cell (WBC) represents one of the most utilized radiopharmaceuticals to diagnose infectious diseases, it is the nuclear medicine gold standard diagnostic technique of many clinical conditions as bone and prosthetic joint infection, diabetic foot infection, infective endocarditis, vascular graft infection and fever of unknown origin with high probability of infection origin. The WBC, after labelling procedure, should preserve their pathophysiologic ability, the diagnosis of infection is infact possible when there is an accumulation overtime of WBCin the site of suspected infection disease.The labelling procedure, that follows the EANM Guidelines (the procedure can be performed using traditional method or by the use of dedicated devices), should be done according to the Good Radiopharmacy Practice and prepared with appropriate environmental requirements. This may be achieved by the provision of a workstation with a laminar flow of HEPA-filtered Grade A air in an environment conforming to at least Grade Dor bythe provision of Isolator workstation. There should be a written detailed procedure for all preparations and Quality Control (QC) of labelled WBC. The QC can be classified in routine and periodically, the routine QC should be done on the eluates of ^{99m}Tc generators (Molybdenum-99 breakthrough, elution activity, aluminum ion breakthrough), labelling kits(final activity, the labelling yield and/or radiochemical purity, particulate contamination)and radiolabelled preparation (visual inspection, labelling efficiency, cell viability). The periodically QC of labelled WBC (sterility and bacterial endotoxins testing) should be performed at least once a year. After routinary QC the responsible person, who should not normally be the person who prepared the product (although there may be no alternative), should take a formal, recorded decision of approval before a product is released.