

## Imaging Infection and Inflammation-towards 2000

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The use of nuclear medicine techniques to image infection has been with us for over 20 years, indeed this year sees the 20th anniversary of the publication of Matthew Thakur's paper of the use of In-111 oxime labelled leukocytes in imaging infection. Without doubt this technique has stood the test of time and has been used to save many lives in infected patients worldwide. As we approach the 21st century, we are faced with new problems which will need new solutions. Infections themselves have changed their very nature. HIV a benign virus which only infected monkeys in central Africa in 1977 has now spread throughout the globe and unfortunately few societies have remained free of its ravages. In its wake tuberculosis continues to infect both the poor and weak but also has started to re-infect more affluent societies. The use of immunosuppressive therapy in many patients with transplants or cancer has lead to new infections in a wider group of patients. The wide spread use of antibiotics has lead to the emergence of antibiotic resistant organisms. The old approach of widespread antibiotic treatment in patients with suspected infection is not acceptable. If possible, organisms must be isolated. Normally imaging is required and it is important to realise that a combination of anatomical imaging with CT, ultrasound or MRI and nuclear medicine is often the only way to determine the site of infection. Allied to this a new educated public has demanded that diagnostic tests be accurate and non-invasive, particularly in non-fatal inflammatory disease.

All these challenges has lead us to a new frontier in nuclear medicine. In some ways we have had to rediscover the old. For example the use of Ga-67 citrate in imaging tuberculosis or infection in patients with AIDS. The use of Tc-99m HMPAO labelled leukocytes in imaging acute infection on the intensive therapy unit becomes popular sometimes nuclear imaging is used to reduce radiation dose in the monitoring of a child with inflammatory bowel disease who had to suffer the indignity of a colonoscopy or a barium enema.

We also look forward to newer techniques, certainly the use of immunoglobulins, both pooled human and monoclonal antibodies directed either against leukocytes or a specific pathogen may prove useful. The new molecular medicine is starting to exploit our knowledge of the mechanisms of infection and inflammation. It may be possible to produce artificial peptides to localise at sites of infection and/or inflammation. Simpler techniques such as radio labelled antibiotics may be the answer, or complex radiopharmaceutical drugs using "stealth" liposomes may be required. All are under development.

We must however also deliver the best clinical service we can at present delivering accurate results with the lowest radiation dose and available when the patient needs it. As

such Tc-99m HMPAO labelled leukocytes are still probably the method of choice in most situations though this may be tempered by local needs and factors.

Also nuclear medicine does not work in a vacuum and must be seen as complimentary to radiology with the early use of nuclear medicine, when anatomical methods have failed.