188Rhenium Generator – A Breakthrough in Therapeutic Nuclear Medicine

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188 Rhenium is a high energy (maximum energy 2.12 MeV) beta emitting radioisotope and decay is also accompanied by a 155 keV gamma emission, which could be detected by gamma-cameras for imaging, biodistribution, or absorbed radiation dose studies. Its attractive physical properties and its potential low cost associated with a long-lived parent make it an interesting option for clinical use. 188Re is particularly well suited for effective penetration in solid tumors. It has a physical half life which is appropriate for therapeutic purposes, reducing the toxicity risks, compared to other therapeutic radioisotopes (153Sm, 89Sr). It is chemically similar to Technetium and many biological results already obtained for the latter could be exploited. Most of all, it can be available onsite from the 188tungsten/188Re generator, in a convenient and inexpensive way (1).

188Re generator has shown utility for a variety of therapeutic applications in nuclear medicine, oncology, and interventional radiology/cardiology. Systemic radionuclide therapy with β-emitting radiopharmaceuticals represents a therapeutic option in the management of intractable metastatic bone pain and has been used since 1942 (Pecher, 1942),) 32Phosphorus (Friedell and Storaassli, 1950), 131Iodine-BDP3 (Eisenhut et al, 1986), 90 Yttrium (Kutzner et al, 1991), 186Rhenium-HEDP (Maxon et al, 1990) and 153Samarium-EDTMP (Turner et al, 1989). More recently, 17mTin-DTPA (Atkins et al, 1995) 188Rhenium-HEDP (Palmedo et al, 2000) and 188Rhenium-DMSA (Blower et al, 2000). (2) Among these 188Rhenium-HEDP is proven its efficacy, advantage and utility over others as a generator product resulting in low costs. Short half-life period of 188Re (17 hours) makes it safer for patients, staff and environment. The half-life period of parent 188W radionuclide (69.4 days) makes it possible to use one generator during the period of 6-12 months (depending on rated activity of generator).

A number of important therapeutic applications of 188Rhenium, which have been developed over the two decades, have demonstrated uses of 188Rhenium as a cost effective alternative to more expensive and/or less readily available therapeutic radioisotopes (3). Clinical trials include the use of 188Re-HEDP and DMSA for the treatment of metastatic bone pain and various 188Re labeled HDD/Lipiodol and DEDC/Lipiodol agents for radioembolytic therapy of Hepatocellular Carcinoma (HCC) (4-14). Among these 188Re labeled Lipiodol developed by Seoul National University has gained popularity mainly through the activities of IAEA and WARMTH. More recently, the use of 188Re colloid for radionuclide synovectomy has been found effective for treatment of refractory disease (15-17).

In Bangladesh we are lagging behind in the field of therapeutic approaches in Nuclear Medicine. In the diagnostic field we have come a long way, but therapeutic field could not develop in the same pace. But availability of the 188Rh generator would boost up the field and serve a lot of distressed people. It is now hoped and expected that the authority would take steps to make it available in the country.

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