Austin Journal of Nuclear Medicine and Radiotherapy

Open Access

Austin Publishing Group

Rapid Communication

PET Radiopharmaceuticals and PET/CT Technology: Comparative Numbers of Brazil, India, Canada and Latin America

Rezende dos Reis SR[1], Thamires de Oliveira[1], Cavalcanti da Silva LF[1], Pinto SR[1], Marta de Souza Albernaz[2] and Ralph Santos-Oliveira[1]

[1]Zona Oeste State University, Laboratory of Radio Pharmacy and Nano Radiopharmaceuticals, Rio de Janeiro, Brazil

[2]University Hospital Clementino Fraga Filho, Radio Pharmacy Service, Rio de Janeiro – Brazil

***Corresponding author:** Ralph Santos-Oliveira, Zona Oeste State University, Rio de Janeiro, Brazil

Received: January 24, 2015; **Accepted:** February 02, 2016; **Published:** February 04, 2016

Abstract

PET radiopharmaceuticals and PET/CT Technology is increasing each day all over the world. The advances arising of this both technologies are enormous. Both, PET radiopharmaceuticals and PET/CT Tomography are of great importance in many specialties like oncology, radiology and mostly, Nuclear Medicine. The use of this tools in USA and Europe are very impressive, especially in the USA were the National Health Policy regarding the reimbursement allows it uses more widely. In contrast, developing economies, like Canada, India and Brazil are facing tremendous difficulties in this process due problems with local policy and investment. However, despite of these problems these technologies are gaining ground and the scenario is changes drastically. This article discusses this scenario and shows some data related to these issues.

Keywords: Radio pharmacy; Nuclear medicine; Oncology; Radiology

Introduction

Over the past few decades, there have been significant advancements in the imaging techniques of positron emission tomography (PET) and Single Photon Emission Tomography (SPECT). The development of positron emission tomography (PET) and Single Photon Emission Computed Tomography (SPECT) imaging continues to grow due to the ability of these techniques to allow the non-invasive in vivo visualization of biological processes at the molecular and cellular level. Positron Emission Tomography (PET) and single photon emission tomography (SPECT) are high-resolution, sensitive, molecular and functional imaging techniques that permit repeated, noninvasive assessment and quantification of specific biological and pharmacological processes in humans. PET and SPECT are also the most advanced technologies currently available for studying in vivo molecular interactions and therefore can advantageously play a key role in both drug discovery and development of pharmaceuticals, by assessing their in vivo distribution, pharmacokinetics, and dynamics, once labeled with a positron or gamma-emitter. Molecular imaging by PET or SPECT with radiopharmaceuticals enables noninvasively quantitative evaluation of physiological function, gene expression, pharmacokinetics of proteins and peptides and distribution of receptors with high sensitivity. The role of PET- and SPECT has been used for initial staging, evaluation of treatment response, and detection of recurrent cancer. The complexity of human anatomy and neoplastic growth produce sophisticated features in images which cannot be fully captured in single-modality images; for that the use of PET with CT technology has been growing each day [1-8].

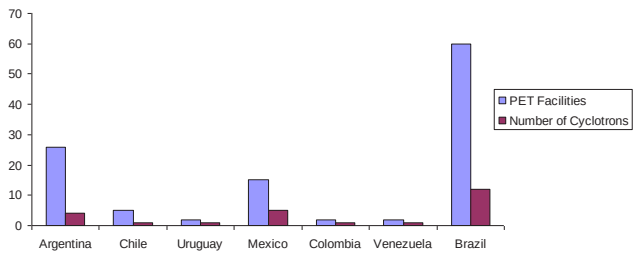
Discussion and Data

The data related to this issue is very difficult to find and in many cases are not well represented. However in the last decades the number of PET production sites and PET/CT facilities are increasing.

Official information regarding developing economies shows that China has 133 PET and PET/CT facilities with 72 operational cyclotrons. Is important to notice that China started this Nuclear Medicine program in 1990's. The situation in Australia is not different. In 2000, Australia had 4 PET (CT) facilities and only 3 cyclotrons operating. By 2011, 32 PET and PET-CT facilities with 32 cyclotrons were in operation [9]. The same is observed in India, which started his program in 2003 with 1 PET facility and 1 cyclotron. Almost one decade later, number of cyclotrons is 20; there are 69 PET and PET-CT facilities [10]. In 2013 a study revealed that the number of PET CT scan required for India was about 100 (one hundred) [11] in 2014 this number reached 92 PET CT facilities. Scan is 92 [12].

The situation in Latin American however is quite different as demonstrated in Graphic 1.

Brazil as the biggest country in Latin America has the highest number of ciclotron (12) and PET CT facilities (69). However as in India this number is not sufficient. The other countries from Latin America are trying to improve their nuclear programs but most of



Graphic 1: Number of PET and PET CT facilities and numbers of cyclotrons in Latin America.

Citation: Rezende dos Reis SR, de Oliveira T, Cavalcanti da Silva LF, Pinto SR, Marta de Souza Albernaz and Santos-Oliveira R. PET Radiopharmaceuticals and PET/CT Technology: Comparative Numbers of Brazil, India, Canada and Latin America. Austin J Nucl Med Radiother. 2016; 3(1): 1016.

them are facing different obstacles. The ultimate problem that most of Latin American countries face is the political issue. In countries like Brazil, which size and cultural and financial differences between each state is very high, is difficult to harmonize a social and a reimbursement policy, in particular in nuclear medicine.

Conclusion

Latin America countries as also India must act and based their strategies like Canada. For that, a mutual effort should be done between these countries, based on the BRICS consortium and the MERCOSUL. Also each individual country must act in their social and reimbursement policies in order to make a real revolution in this aspect, and enabling the increase of radio pharmacy and nuclear medicine.

References

1. Chawla M, Kumar R, Agarwala S, Bakhshi S, Gupta DK, Malhotra A. Role of positron emission tomography-computed tomography in staging and early chemotherapy response evaluation in children with neuroblastoma. Indian J Nucl Med. 2010; 25: 147-155.
2. Han D, Bayouth J, Song Q, Taurani A, Sonka M, Buatti J, et al. Globally optimal tumor segmentation in PET-CT images: a graph-based co-segmentation method. Inf Process Med Imaging. 2011; 22: 245-256.
3. Maas M, Rutten IJ, Nelemans PJ, Lambregts DM, Cappendijk VC, BEETS GL, et al. What is the most accurate whole-body imaging modality for assessment of local and distant recurrent disease in colorectal cancer? A meta-analysis: imaging for recurrent colorectal cancer. 2011; 38: 1560-1571.
4. Santos-oliveira R, Antunes L. J Radiopharmaceutical Research and Production in Brazil: A 30-year History of Participation in the Nuclear Medicine Scenario. JNMT. 2011; 39: 237-239.
5. Santos-oliveira R, SMITH SW, Albernaz MS, Bordim JA, Antunes LJ. Surveillance of radiopharmaceuticals in Latin American: an alert Rev Esp Med Nucl. 2011; 30: 134-136.
6. Stacy MR, Maxfield MW, Sinusas AJ. Targeted molecular imaging of angiogenesis in pet and spect: a review. Lele V. Yale J Biol Med. 2012; 85: 75-86.
7. Pimlott SL, Sutherland A. Molecular tracers for pet and spect imaging of diseases. Chem Soc Rev, 2011; 40: 146-162.
8. Ono M. Molecular imaging by pet/spect. Yakugaku Zasshi. 2009; 129: 279-287.
9. Martinuk SD. The use of Positron Emission Tomography (PET) for cancer care across Canada.
10. Rangarajan V. Nilendu C Purandare, Anshu R Sharma, Sneha Shah. PET CT current status in India. Indian J Radiol Imaging. 2008.18: 290-294.
11. Duatti A. In vivo imaging of oligonucleotides with nuclear tomography. Curr Drug Targets. 2004; 5: 753-760.
12. Nueclear PET CT.

Citation: Rezende dos Reis SR, de Oliveira T, Cavalcanti da Silva LF, Pinto SR, Marta de Souza Albernaz and Santos-Oliveira R. PET Radiopharmaceuticals and PET/CT Technology: Comparative Numbers of Brazil, India, Canada and Latin America. Austin J Nucl Med Radiother. 2016; 3(1): 1016.