

Nuclear Medicine Imaging

Student's Name

University Department

Date

To: Patients anticipating an NMI treatment, general public audience, and medical practitioners

CC: Dr. Sarah Read, Dr. Paul Collins, Professor Covey, and WR227 course members

From: [Insert your name][<-Fill in]

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Abstract

This paper provides the general audience with information that pertains to Nuclear Medicine Imaging (NMI). The problem stated is the ineffectiveness of the traditional methods of diagnosing patients, which should be replaced by NMI. The technology detects diseases in their early stages and facilitated early treatment interventions. In the world majority of hospitals are using NMI for diagnosis and molecular information of their patients.

Keywords: Nuclear Medicine Imaging, endocrine, gastrointestinal, tagging and radiopharmaceuticals

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Version history

Version	Description	Name	Date
v.0.2	Publication of v1.0 document: “Nuclear Medicine Imaging”		

List of Figures and Tables

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Introduction

Nuclear Medicine Imaging is the current and most important technology in medicine. Since new diseases are requiring sophisticated treatment methods, Nuclear Medicine Imaging stands out as a reliable technology to facilitate the effective diagnosis and treatment of these diseases. Nuclear medicine refers to the technique of using radiopharmaceuticals, also known as radioactive materials. The radiopharmaceuticals are used during the examination of the structure and function of human body organs.

There is a current disease that does not require the use of traditional diagnostic methods and treatment, which functioned effectively when a disease reaches some stages. Therefore, it is essential to inform people about the importance of NMI, which should be embraced to detect early stages of diseases to facilitate early treatment (“Nuclear Medicine” n.d). The paper will benefit groups of people, including professional medical practitioners, patients, and any member of the general audience.]

Methods

The paper is based on a qualitative analysis of pre-existing data. Usually, the information presented in this research paper is borrowing from secondary sources. The sources provide varied information on NMI technology, such as the procedure of detecting diseases using NMI and how the technology is embraced (“Nuclear Medicine” n.d). It suffices to hold that the method of data collection is sampling data from pre-existing scholarly articles. The paper aims to inform the general audience about NMI’s importance and, which is relevant during the 21 century. All the chosen scholarly materials, as secondary sources, contain relevant information about the technology.

Results

How technology was developed

A scientist known as Ernest Orlando invented the technique of NMI IN the 1930s. He built a machine called cyclotron which was, a 4-inch diameter device, in 1930. The equipment used 2 D-shaped-magnets to form the magnetic fields. The magnets were arranged such that they left a thin gap between them. Lawrence placed a particle at the outer side of the magnetic field. When the machine was started, the magnetic fields increased the radius of the beam path, eventually reaching the target particle.

Figure 1: Gamma Camera used in Nuclear Medicine (shutterstock)



Benefits of Nuclear medicine imaging

Lawrence's idea has been modified over time to produce the best cyclotron devices in the world. The machines are small and have proven effective in dealing with neurological, endocrine and gastrointestinal disorders, heart disease, and cancer, among other conditions (Love & Palestro, 2016).

Nuclear imaging procedures

The process entails drawing blood from the bloodstream to mix it with a radionuclide, a process called tagging. Then, the tagged blood is injected into the patients' blood (Cho et al. 2017). Once the radionuclide is mixed with red blood cells, it moves to the body's specific organ with a medical problem. Usually, areas with inflammation or tumor and scanners are used to trace the emission of radioactive energy by the radiotracers in the red blood cells (Bar-Sever et al. 2018). The cameras also give molecular information.

Figure 2: A doctor performing nuclear medicine imaging procedure to a patient (“General Nuclear Medicine”)



Discussion

The technology started 50 years ago, and many modern medical practitioners like nurses and doctors embrace it. Nuclear medicine contributes to personal profile based treatment of various diseases (Donohoe & Ahuja, 2019, March). It is noted that the concept of personalized medicine is being embraced through nuclear medicine technology. Also, the technique of Nuclear Medicine speeds up change in the provision of quality healthcare services.

Procedure used to detect diseases

The administering of the radiotracers takes place through the process of tagging them with red blood cells (KqA Reilly, 2019). The second phase, the patient is placed in the scanning machine and instructed not to twist his or her body unless required to do so. The last phase involves the interpretation of the images taken during scanning and molecular investigation of the affected area.

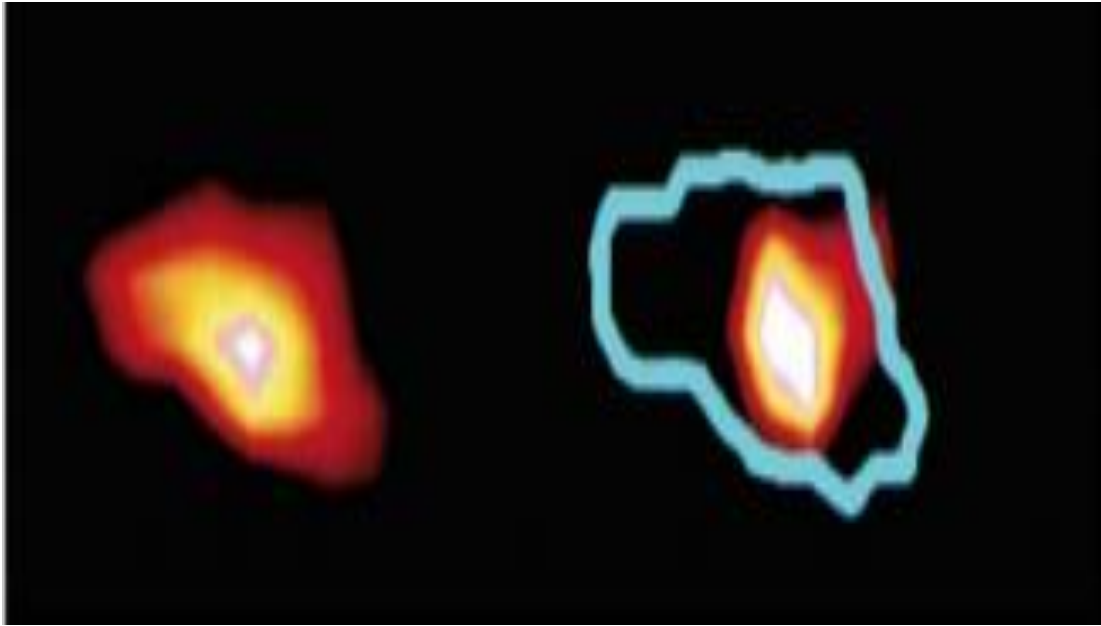
Figure 3: Brain scan using Gamma cameras in nuclear medicine imaging equipment (“⁹⁴ Gamma Scan stock pictures and images”



Clinical guidance in nuclear medicine imaging

First perform blood tagging using radionuclide. Secondly, place the patient in the NMI machine and attach. Then attach the patient to the cyclotron using intravenous IV tubes and electrodes (KqA Reilly, 2019). Perform scanning and obtain the results. Analyze the results and administer the correct treatment.

Figure 4: Detected lung tumor using Nuclear Medicine Imaging procedure (Buvat et al. 2014)



Conclusion

It suffices to conclude that there is rapid growth in nuclear medicine all over the world. Governments and other stakeholders in the health sectors have invested a lot of resources to improve the quality of services rendered in medicine. Among the many procedures and technologies used in the treatment of various diseases, nuclear medicine imaging stands out as the most embraced by contemporary medical officers. Therefore, technology should never experience-ending advancement to benefit the world population.

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