Research Practice Development for Nuclear Medicine Technologists: An Innovative Experience

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Introduction

European nuclear medicine technologist's education is delivered by Higher Education Institutions and students obtain a grade of Bachelor of Sciences (BSc), during which they are initiated to research during their studies. Once BSc nuclear medicine technologists are in professional practice, they have very few opportunities to develop a real research experience and they rather become passive users than active contributors the growth of scientific knowledge in nuclear medicine.

Aim

To describe and discuss an innovative educational and professional experience aimed in strengthen research knowledge, skills and competencies of former nuclear medicine technologists student in the context of an international mobility stay.

Description and Discussion

With a grant financed by the European Commission under the mobility programme Leonardo da Vinci, Opportunities for Health Care Professionals in Europe (OHPE), a young nuclear medicine technologist graduated from the *Escola Superior de Tecnologia da Saúde de Lisboa* (ESTeSL) of the *Instituto Politécnico de Lisboa* worked 5 months as research assistant at the *Haute École de Santé Vaud, University of Applied Sciences and Arts Western Switzerland* and the Nuclear Medicine Department of the *Lausanne University Hospital*. Within the sustainable collaboration between these institutions, a research topic project was identified on optimizing image reconstruction parameters in Rb-82 cardiac PET/CT. Indeed, optimal reconstruction parameters for cardiac PET/CT imaging have not been determined yet and little is known from the literature. (Fig.1)

	Reconstruction protocols	No. of iterations	No. of subsets	It x Ss	FWHM filter (mm)
B	OSEM+TOF	4	16	64	6
C	OSEM+TOF	3	16	48	4
D	OSEM+TOF	2	16	32	6
E	OSEM+TOF+PSF	3	16	48	6
F	OSEM+TOF	3	16	48	8
G	OSEM+TOF	3	16	48	6
H	OSEM	3	16	48	6

Fig. 1 Ordered-Subsets Expectation Maximization protocols

The project investigates the use of time-of-flight (TOF) and scatters correction, reconstruction type (PSF=point spread function correction) and their parameters on absolute myocardial blood perfusion. (Fig. 2. and 3.)

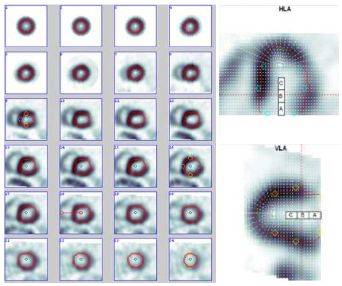

Fig. 2: Ellipsoid model and change of reference frames (FlowQuant©)

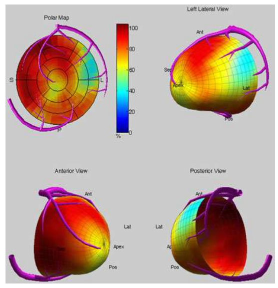

Fig. 3 Polar maps projected on 3D perspective views of the left ventricle (FlowQuant©)

The research was implemented in a multi-professional environment (physicians, physicists, technologists and educators) and the milestones of a research process included a literature review, protocol design, data acquisition, processing, analysis and delivery of results. The young nuclear medicine technologist produced as first author 2 abstracts that were accepted in scientific conferences (Fig. 4. and 5.) and subsequently wrote and submitted a scientific paper to a peer-reviewed journal.

Fig. 4 Lisbon (Portugal), May 2014

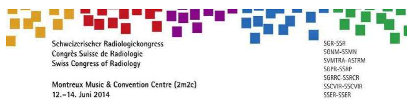

Fig. 5 Montreux (Switzerland), June 2014

Conclusion

This experience highlights that only a professionalization process allows the development of competencies. It might be consider as a third educational culture completing the initial cultures of training based on skills acquisition and teaching focused on knowledge learning. Consequently, effective research practice appears crucial to the professional development of nuclear medicine technologists. In addition, sustainable international collaboration between hospitals and educational institutions can effectively help developing innovative educational solutions to addressing future professional challenges.