Improving Workflow in Nuclear Medicine to Ensure Correct Radiopharmaceutical Injection

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INTRODUCTION

• Radiopharmaceutical syringes were prepared and labeled with different syringe codes, types of scans, and radioactivity (Figure 1).

• These syringes are delivered in bulk from authorized manufacturer and do not contain patient details due to the Personal Data Protection Act.

• The busy workload, with nearing 20 radiopharmaceutical injections and handling different types of radiopharmaceutical injections within a short period of time, could ultimately lead to a higher possibility of wrong radiopharmaceutical injections and unnecessary radiation to patient.

• Aim: To deduce the likelihood of wrong radiopharmaceutical injections.
METHODS

Root cause analysis

Radiopharmaceutical Syringes
- No patient ID and only syringe codes
- Staff who are not trained in reading syringe code will match wrong syringe to patient.
- Not train in reading the syringe code. Rely and trust radiographers prepare the correct syringes.
- Do not know if wrong syringes prepared

Process
- Syringes prepared by radiographers only. No one verify if correct syringe prepared.
- No one else able to catch the mistake.
- Not train in reading the syringe code. Busy with preparing patient for stress test.
- Do not know if wrong syringes prepared

Nurses
- Not train in reading the syringe code.
- Busy with patients.
- Do not know if wrong syringes prepared

Cardiac Technologist
- Not train in reading the syringe code. Busy with preparing patient for stress test.
- Do not know if wrong syringes prepared

Radiographers
- Prepare different types of radiopharmaceutical syringes for multiple patients at the same time.
- Lapse of concentration can result in wrong syringes prepared

Injecting the wrong radiopharmaceutical to patient

Restricted, Sensitive (Normal)
Plan-Do-Act-Study (PDSA)

1st PDSA
- Staff are to carry a laptop for verification purposes before injection.
- Multitask, rely on injection staff and compromise hygiene purposes.

2nd PDSA
- Tagging a patient sticky label to radiopharmaceutical syringes.
- Rely on radiographer who prepare the syringes and not all staff understand the syringe code.

Further Improvement on 2nd PDSA
- Second verifier to verify the syringe code and patient details against patient before injection.
- Train all staffs to read syringe code.
- Responsibility shared among all staffs.
Success Indicators

- Low or no medical errors on the wrong radiopharmaceutical injections post-implementation of the patient sticky label and second verifier.
- Increase staff confidence level when performing the radiopharmaceutical injections.
- High compliance rate to the new workflow.
Figure 3: There were zero radiopharmaceutical injections since the implementation of patient sticky label and second verifier (February 2020 to February 2023).
• A survey conducted among 38 Nuclear Medicine staffs (5 radiographers, 2 resident physicians, 11 cardiac technologists and 1 other) on their confident level in performing the injections post-implementation.

• Average confidence level for the patient sticky label with second verifier scored the highest (8.11).

• Random audit were performed and showed that 100% compliance rate to the new workflow.

Figure 4: Level of Confidence in Various Practices
DISCUSSION

• This improved workflow has ensured correct radiopharmaceutical injection is performed by all staff at all times.

• Having a patient sticky label on the radiopharmaceutical syringes and the presence of the second verifier increase the confidence level when performing injection and minimize the possibility of selecting the wrong radiopharmaceutical syringes.
Acknowledgements

Nuclear Medicine Team:
• Jolene Ooi Wei Ling (Head of Department)
• Cyrus Poon Jun Xian (Physicist)
• Cheang Pei Shi Shirlyn (Senior Radiographer)
• Meera Nair (Radiographer)
• Jeffrey Teo Lai Hock (Radiographer)
• Lim Teck Cheng (Radiographer)
• Nursing team
• Resident Physicians from Cardiology Department
• Cardiac Technologists from Clinical Unit Measurement

Thank you for their contribution and support to the project.