Istanbul2024

Health for People and Planet

Building Bridges to a Sustainable Future

40th International Conference

24 - 27 September

#ISQua2024

衛生福利部雙和醫院(委託臺北醫學大學興建經營)

Taipei Medical University-Shuang Ho Hospital, Ministry of Health and Welfare

ISQua International Society for Quality in Health Care

REPUBLIC OF TÜRKİYE MINISTRY OF HEALTH

TÜSKA TÜRKİYE HEALTH CARE QUALITY AND ACCREDITATION INSTITUTE

Preventing Abnormal Safety Events in MRI Examinations Using HFMEA

H.H. TSAI [1], Y.C. HUANG [1], M.C. HSIAO [1] and Y.H. LU [1]

1 Taipei Medical University-Shuang Ho Hospital

P343

INTRODUCTION

The Magnetic Resonance Imaging (MRI) examination environment requires static magnetic fields, pulsed gradient magnetic fields, and radio frequency pulses that are 30,000 to 60,000 times stronger than the Earth's magnetic field. These interact with body tissues and equipment under examination and may produce movement, torsion forces, and equipment damage. Increased temperature, muscle and nerve stimulation, and loud noise may cause serious injury or even death to the patient during the examination.

Therefore, the Health Failure Mode & Effect Analysis (HFMEA) method is used to analyze high-risk factors in the examination process and to develop countermeasures for specific causes to minimize high-risk events that may endanger patient safety when entering the MRI examination room.

AIM

Use the HFMEA method to analyze high-risk factors during the examination, formulate countermeasures for individual reasons, and minimize high-risk events that may endanger patient safety when entering the MRI examination room.

METHOD

After breaking down the inspection process into detailed steps, use the severity rating table and the occurrence rating table to analyze each step of the inspection process into a hazard index. Then through the decision tree, a total of 15 items that need to be improved were found in the process details. After the team members discussed the solutions, they were classified into 5 countermeasures. The implementation of these countermeasures is as follows:

1.Update of consent forms and additional health education videos.

In order to solve the reasons why the consent form was incompletely filled in and the patient could not understand the consent form, the consent form was digitized and a health education video (QR-Code) was recorded in the consent form.

2.Double-check of checklists.

In order to solve the problem of failure of medical staff to confirm the inspection items, the confirmation method when administering contrast agent is adjusted. Before the MRI contrast agent is administered, the radiologist and the nurse administering the contrast agent jointly confirm the inspection items, patient information and contrast agent dose on the checklist, and sign the checklist after confirmation.

3.MRI workspace magnetic field reality experience.

Ward nurses are regularly arranged to conduct education and promotion, and after the course students are invited to the MRI room to experience the examination room using tools such as paper clips and rubber bands.

4.Distribution of reminder leaflets.

Design a form to list the four major omissions that patients in the ward can easily make before MRI examination. Paste a reminder leaflet on the cover of the medical record book of the patient in the ward where the omission is found to remind the nurse to deepen the impression.

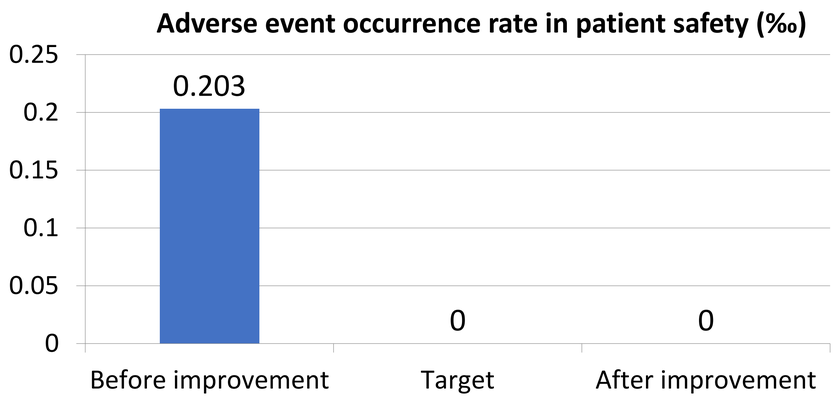
5.Smart alert system for patient check-in.

When the patient checks in, the information system pops up a reminder about implants in the body.

RESULTS

After implementing these countermeasures over six months:

Countermeasure group	Metrics	Before improvement	After improvement
1. Update of consent form and health education video	Incomplete consent rate	32%	7.7%
2. Double check the checklist	Number of abnormal cases of contrast agent execution	1	0
3. Education and promotion of medical staff	Number of high-risk risk events	38	23
4. Attach a reminder leaflet	Number of high-risk risk events	5.75 / week	2 / week
5. Establish an information warning system	Preventing contraindications to internal implants	0	1



Regarding the countermeasure group to prevent the occurrence of abnormal patient safety events in magnetic resonance imaging, high-risk events have decreased or have not occurred, resulting in an occurrence rate of zero for abnormal patient safety events.

In the future, we hope to make the consent form available online and establish a confirmation level. If the necessary fields are not completed, users will not be able to proceed to the next step, thereby strengthening the accuracy of filling out the patient's consent form.

CONCLUSIONS

This initiative has proven effective in preventing all potential safety anomalies before patients undergo MRI examinations. The implemented measures address concerns such as the introduction of extracorporeal foreign bodies and cardiac pacemakers into the examination room, enhance patient understanding of the examination process, and serve as an effective reminder for staff regarding safety details that are prone to oversight..

ACKNOWLEDGEMENT

We would like to thank Taipei Medical University-Shuang Ho Hospital for its commitment to medical quality improvement activities and for providing information technology assistance and liaison between departments. Special thanks to the Chief of the Radiology Department for his support.

CONTACT INFORMATION

Welcome to discuss and give advice.
Author e-mail:12388@s.tmu.edu.tw

REFERENCES

1.David W. Chen(2001,July 31). Boy, 6, Die of Skull Injury During M.R.I. https://www.nytimes.com/2001/07/31/nyregion/boy-6-dies-of-skull-injury-during-mri.html.
2.Jana G. Delfino et al. (2019, August16). MRI-related FDA adverse event reports: A 10-yr review. Medical Physics. Volume46, Issue12.
3.Gregory Chaljub et al.(2001) Projectile Cylinder Accidents Resulting from the Presence of Ferromagnetic Nitrous Oxide or Oxygen Tanks in the MR SuiteAmerican Journal of Roentgenology 2001;177: 27-30.