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SAFety in Radiation ONcology

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Updates on Patient Safety in Radiotherapy

May 2019

Using Checklists Effectively

Using Checklists Effectively

Checklists used in medicine can promote process improvement and increase patient safety. Implementing a formalized process reduces errors caused by lack of information and inconsistent procedures, however it can be challenging.

Checklists have improved processes for hospital discharges and patient transfers as well as for patient care in intensive care and trauma units. Along with improving patient safety, checklists create a greater sense of confidence that the process is completed accurately and thoroughly. Checklists can have a significant positive impact on health outcomes, including reducing mortality, complications, injuries and other patient harm. For example, studies in surgical units that use checklists can reduce major post-surgical complications and decrease morbidity. The World Health Organization developed a short checklist to support the reduction of surgical errors that can be implemented. (2)

Administration of blood products also use checklists to support patient safety. "BloodSafe" a promotional campaign by the Government of South Australia has a visual checklist that provides images and information on the blood identification tag and then a series of questions and methods to answer them. Do you have the: Right Patient, Right Product, Right Blood pack and Right Prescription? (3)

"Good checklists, on the other hand are precise. They are efficient, to the point, and easy to use even in the most difficult situations. They do not try to spell out everything--a checklist cannot fly a plane. Instead, they provide reminders of only the most critical and important steps--the ones that even the highly skilled professional using them could miss. Good checklists are, above all, practical."

Atul Gawande,
author Checklist Manifesto (1)

Submit your Proposal on How to Strengthen Radiation Safety Culture in Medicine and Win a Trip to Vienna!

Radiation medical professionals and students can submit proposals to be included in an IAEA training program demonstrating a strong radiation safety culture in healthcare. The deadline for submissions is 15 May 2019, and the top three participants will receive a travel grant to present their projects at the IAEA in Vienna at the launch of this training.

Read more about the IAEA competition: Towards a Strong Radiation Safety Culture in Medicine here.

In radiotherapy we see the use of checklist to improve patient safety and quality outcomes and to eliminate medical errors. At the University of Florida, USA a large referral hospital, they have provided a checklist to assure the new patient brings the appropriate information for their consultation. This example of a checklist maybe be dependent of the medical patient records network within a country.

The patient should provide:

- ✓ Picture identification (e.g., driver's license, passport, or school id) and your insurance card(s)
- ✓ A disc with any imaging scans performed in the last 6 months
- ✓ Pathology slides done in the last 6 months
- ✓ Pertinent outside reports (e.g., pathology, CT, MRI, bone scan, and PET)
- ✓ Any records of previous radiotherapy (4)

Why use checklists?

Avoidable failures are common and persistent, not to mention demoralizing and frustrating. The volume and complexity of what we know is being exceeded and the distractions can be great. It becomes increasingly difficult to focus efforts and assure all activities are completed as planned. The increased knowledge and technology transformation have improved outcome in radiotherapy but may have burdened us to remember and watch so many other things that were not required just a few years ago. One example is the increasing responsibility of therapists to view many monitors in the control room.

We have seen the development and use of checklists in health care increased as technology and volume have increased. In 2010, a Health Leaders Media Industry Survey reported that 88.8 percent of quality leaders use checklists to prevent errors in hospital operating rooms. (5)

Checklists are used as cognitive aids in health care to help support safe and effective healthcare. Checklist are organizational tools that should outline critical criteria for a process. A checklist can be a list of action items, tasks and behaviors arranged in a consistent manner that allows the evaluator to record the present or absence of an individual item or process. It can be a check off list identifying activities that are completed or verified, identified or answered.

Another resource to improve safety and quality in radiotherapy

SAFRON now has over 600 events mapped to the SEVRRA risk matrix. The risk matrix establishes risk management priorities based on analysis of frequent and undesirable events and consequences, allowing the classification of risk into levels which can then be used to prioritize activities. The first step is to analyse the reported error and determine the initiating event that lead to reporting the event. The next is to look at the sequence of events, what failed in the sequence that lead to the event and what are the possible safety measures and the consequences. Safety measures or safety barriers are the measures put in place to avoid, prevent, detect, control and reduce or mitigate the consequences of an accident once an initiating event has occurred. To identify these reports in SAFRON, look for the following fields in the SAFRON events.

Is risk assessment complete?	Yes
Risk assessment url:	https://sevrra.foroiberam.org/riesgo/assess.php?id=142

How to make your checklist effective

Checklist can be useful, and checklist can be useless.

To develop an effective checklist a systematic and comprehensive approach should be considered. The key to assure staff use checklists as planned, is to spend time developing a quality checklist that is accepted and used by staff in a strong culture of safety.

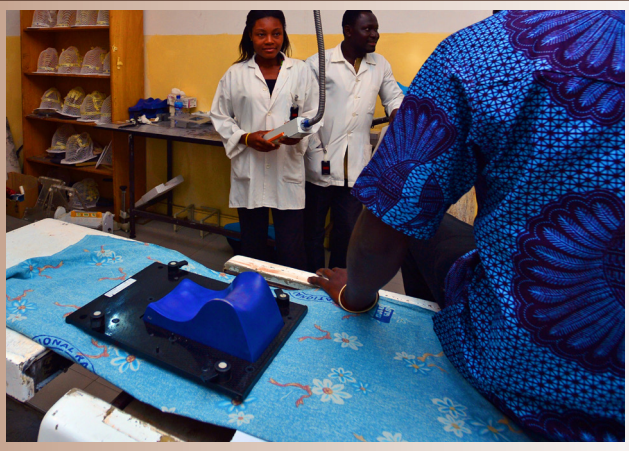
Checklists handed down to employees will not be as effective as checklists that are develop with employees. Checklists have more value if the employee is committed to the purpose that the checklist was designed to improve. Along with improving patient safety, checklists create a greater sense of confidence that the process is completed accurately and thoroughly. Use of checklist can also improve staff satisfaction if the checklists are valued as important to the overall safety of the patient.

The type of checklists used really depends on the outcome you wish to achieve. You may have a procedural checklist for calibration or quality assurance checklist. For assuring that all key information is in the patient treatment records you may have a "laundry list" or check-off checklist. There are other examples that can be found in the AAPM publication Medical Physics Practice Guidelines 4.a:Development, implementation, use and maintenance of safety checklists. (6)

Checklists should be part of the process, not just a checklist. The success of checklists and the desired action is dependent on the established relationship within the organization.

Staff need to feel important and accountable. Staff should be consulted on their development and implementation since this will directly relate to their job performance and should be based on staff's current experiences. This will allow staff to feel that they are valued member of the treatment team.

"No wise pilot, no matter how great his talent and experience, fails to use his checklist."
Charlie Munger



References:

(1) Gawande, A. (2010). The checklist manifesto: How to get things right. New York: Metropolitan Books.
(2) World Health Organizations Surgical Safety Checklist https://www.who.int/patientsafety/safesurgery/checklist/en/
(3) South Australia Checklist for Transfusion of Blood Products, https://www.sahealth.sa.gov.au/wps/wcm/connect/a01863ab-ca62-441c-a5e9-9e7762e31830/Bedside+Checklist+with+New+Pack+Label+Fast+Facts+v1.0.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-a01863ab-ca62-441c-a5e9-9e7762e31830-mEbuRnX (accessed 7 April 2019)
(4) New Patient Checklist https://radonc.med.ufl.edu/patient-care/new-patient-checklist/ (accessed 4 April 2019)
(5) Checklists to Improve Patient Safety. June 2013 Health Research & Educational Trust. (2013, June). Checklists to improve patient safety. Chicago: IL. Illinois. Health Research & Educational Trust. Accessed at www.hpoe.org
(6) Fong de Los Santos LE, Evans S, Ford EC, et al. Medical Physics Practice Guideline 4.a: Development, implementation, use and maintenance of safety checklists. J Appl Clin Med Phys. 2015;16(3):5431. Published 2015 May 8. doi:10.1120/jacmp.v16i3.5431

SAFRON data concerning events and checklist

The corrective actions for these events included developing, updating checklist or following an established checklist. Checklists are living documents and as they are used, they need to be updated and modified based on near events or events that reached the patient. Updates to checklist follow the same recommendations as creating them, it should be a team effort assuring that representation from each of the professionals are participating in the development and modification process.

#	Title of the Event	Event Details	Preventive Actions
1.	Location of the tumor was incorrectly tattooed on the patient	During simulation the location of the tumor was incorrectly tattooed on the patient. This positioning error was not detected by the physician when the patient setup films were reviewed on the first day of treatment. The patient was incorrectly treated for seven days. On the eighth day new setup films were taken and the setup error was discovered by a radiation therapist and confirmed by the physician.	Address potential error in policy and procedures Verify treatment set up on day one Complete port films every 5 days Add a hard stop/time out before treatment to the treatment **checklist**.
2.	The dose delivered on the first fraction was 300 cGy, with a prescription of a total dose of 2,400 cGy over 12 fractions at 200 cGy/fraction	The patient received the first fraction of 12 planned fractions with the wrong dose on the Tomotherapy 6 MV accelerator. The prescription called for a total dose of 2,400 cGy over 12 fractions at 200 cGy/fraction. The dose delivered on the first fraction was 300 cGy. The error is attributed to a misinterpretation of the prescription by the Medical Physicist planning the treatments, and the failure of a second, independent check of the treatment plan to identify	Independent check of prescription prior to treatment. This was added to the QA **checklist**. Additional training for staff.
3.	Patient received treatment delivered via unintended plan	The physician prescribed treatment for this case was 3750 cGy in 15 daily fractions of 250 cGy per fraction. The delivered treatment plan was developed from the same total dose (3750 cGy) but the number of fractions was reduced to 10 fractions in error, which resulted in a daily dose of 375 cGy per fraction. Prior to treatment, the incorrect plan was reviewed and initialled by the radiation oncologist. During the weekly chart checks the medical physicist did not detect the discrepancy between the dose prescribed on the top page of the treatment chart, and the dose entered on treatment plan. The error was discovered by the therapist on January 21, 2014, after the seventh fraction was delivered. As a result, the administered dose was evaluated, and a treatment was modified to give a biologically equivalent dose over the originally planned treatment duration.	Implemented a policy change regarding verification of physician's prescriptions, and dose verification on first day of treatment. Developed a **checklist** as well as reorganization of patient's treatment charts with attention to the physician's prescription
4.	The therapist did not notice that the patient was to be treated with two isocenters	A patient was undergoing external beam radiation therapy using two different isocentres. Since two isocenters were planned, a table shift was required in between the two treatments. The therapists completed the first treatment and then proceeded to the second treatment but did not apply the appropriate table shift to position the patient at the second isocenter. The second treatment field missed the intended region and exposed the first region to > 50% additional prescription dose for that fraction. The discrepancy was noticed during the treatment before the second field was completed.	Use of **checklist** and updated policies and procedures
5.	The prostate of a patient was only partially treated during the first four treatment fractions and an unintended dose was delivered to the patient's rectum	On 3/22/2012, at the ONCOR treatment machine, a patient was undergoing treatment for cervical cancer. The treatment was AP:PA fields, but due to the patient losing marks, the patient was re-simulated on the Acuity device using fluoroscopy to align the patient. The separation at the isocenter plane of treatment was 18 cm instead of the originally calculated 20 cm from the CT scan. The set up SSD's were not entered into the EMR for the first fraction.	Changed **checklist**, use of location beacons and added a radiograph to determine the location of the beacon
6.	Patient's right ear unnecessarily treated	Patient was to have keloids removed from both ears surgically followed by radiation treatments. A radiation treatment plan was created for both the left and right ear ahead of the surgical procedure. During surgery it was decided to remove only the keloid from the left ear. When therapy began, both ears were treated for 3 fractions before a therapist recognized that the right ear had no surgery performed. The fact that the right ear did not have surgery was not communicated to the radiation therapists. The primary physician was on vacation at this time and a locum physician reviewed the patient prior to treatment and approved the clinical setup for both ears.	Introduced a **checklist**
7.	Patient treatment site not as prescribed	The patient was positioned per treatment plan on the accelerator. After a portion of the treatment was completed, the therapist noted a couch shift had occurred. It was noted that the incorrect anatomical site had been treated. The prescribing MD was notified.	Revision of policy for pre-treatment **checklist**. Auditing of completion of the QA checklist specifically the audio and visual monitoring, override access granted only to physicists
8.	Shift made off wrong tattoo	Official electronic record specified a superior 1cm shift of isocenter off AP tattoo. Patient was correctly aligned and treated for two fractions. The third fraction, done by different therapists than the first two fractions, used set up notes written on a treatment card that indicated the shift be done off lateral tattoos. The same therapists set up patient for fourth fraction, took alignment ports before treatment; found and corrected their placement error.	Revised **checklist** and training on electronic field notes
9.	Dosimetrist set up treatment plan with wrong isocenter shift, this caused a weekly dose great than 30%	Dosimetrist set up 2 plans for treatment of a chest wall and supraclavicular target with the isocenter shifted by 5 cm. Plan approved for treatment but failed to shift for supraclavicular treatment field. Therapists treated according to plan, oncologist failed to notice improper shift on first weekly chart round. Seven treatments were given without the appropriate isocenter shift and the oncologist found the mistake during the second weekly chart check.	Revised **checklist** and established communication plan for notifying staff of unexpected deviations in the treatment plan
10.	Field was omitted during treatment for 2 days and compensation was erroneously done on a different field	A field in field was omitted from treatment for 2 days (Accounting to 0.02% of the dose per #, upon discovery compensation was scheduled and this was done on a different field (0.03%) of the dose per # from the intended one. Correction was made on both fields accordingly	Implementing post treatment **checklist**
11.	Two separate treatment plans were administered simultaneously resulting in two times the prescribed dose, or a total dose differing by 100% for the first week	The treatment plan called for 19 fractions of two oblique fields to deliver 2 Gy, followed by 11 fractions of an arc field, also to deliver 2 Gy. Instead of the two separate plans being treated subsequently, they were treated simultaneously for the first five days of treatment. Each day the patient received 4 Gy, rather than the intended 2 Gy. The total dose to the treatment site differed from the prescribed amount by 100% for the first week of treatment. Accelerator unit, planning software and record-and-verify software from 3 different vendors. The dosimetrist entered the treatment fields from 2 plans as if all were to be delivered each day.	Improve**checklist** that verifies agreement in the number of treatment fields planned and the sequence of plans compared to the treatment calendar. The licensee has been approved to acquire new record-and-verify software and additional staff.

SAFRON data concerning events and checklist

Surgical Safety Checklist

World Health Organization | Patient Safety
A World Alliance for Safer Health Care

Before induction of anaesthesia → **Before skin incision** → **Before patient leaves operating room**

(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?
- ☐ Yes

Is the site marked?
- ☐ Yes
- ☐ Not applicable

Is the anaesthesia machine and medication check complete?
- ☐ Yes

Is the pulse oximeter on the patient and functioning?
- ☐ Yes

Does the patient have a:

Known allergy?
- ☐ No
- ☐ Yes

Difficult airway or aspiration risk?
- ☐ No
- ☐ Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?
- ☐ No
- ☐ Yes, and two IVs/central access and fluids planned

(with nurse, anaesthetist and surgeon)

- ☐ **Confirm all team members have introduced themselves by name and role.**
- ☐ **Confirm the patient's name, procedure, and where the incision will be made.**

Has antibiotic prophylaxis been given within the last 60 minutes?
- ☐ Yes
- ☐ Not applicable

Anticipated Critical Events

To Surgeon:
- ☐ What are the critical or non-routine steps?
- ☐ How long will the case take?
- ☐ What is the anticipated blood loss?

To Anaesthetist:
- ☐ Are there any patient-specific concerns?

To Nursing Team:
- ☐ Has sterility (including indicator results) been confirmed?
- ☐ Are there equipment issues or any concerns?

Is essential imaging displayed?
- ☐ Yes
- ☐ Not applicable

(with nurse, anaesthetist and surgeon)

Nurse Verbally Confirms:
- ☐ The name of the procedure
- ☐ Completion of instrument, sponge and needle counts
- ☐ Specimen labelling (read specimen labels aloud, including patient name)
- ☐ Whether there are any equipment problems to be addressed

To Surgeon, Anaesthetist and Nurse:
- ☐ What are the key concerns for recovery and management of this patient?

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009

Calling all SAFRON users

Are you using SAFRON as your incident learning system? Want to share your results and make recommendation on improving SAFRON?

The IAEA will host a technical meeting for SAFRON users 1-3 October 2019. If you are using SAFRON as your incident learning system and want to influence the upgrades to the system planned for 2020. Please let the coordinators of SAFRON know at SAFRON.Contact-Point@iaea.org. There will be a limited number of travel grants to attend the meeting. More information on the process will be provided to those who are interested and can contribute to improving SAFRON in prevention of errors.

Have you increased your understanding of Safety and Quality in Radiotherapy?

You may be able to receive continuing professional development credits for completing the course. The IAEA web-based training provides a certificate for those who complete the on-line course. Be the leader in your facility in improving the patient experience.
Visit http://elearning.iaea.org/m2/course/view.php?id=392 today to start the course.