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Operator Training in HDR Brachytherapy: Preventing Treatment Errors

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Disclosure

Zoubir Ouhib, MS, DABR, is a speaker for ELEKTA and Varian.



Learning Objectives

- Be familiar with methods of training
- Understand the correlation between training and treatment errors in high-dose-rate (HDR) brachytherapy
- Understand how treatment errors occur
- How to maintain a safe HDR brachytherapy program and reduce errors
- Understand the importance of items like checklists, peer review, policies and procedures, QA
- Importance of continuing quality improvement

Methods of Training

- Manufacturer training
- Proctor training
- Training from professional associations and institutions
- Peer review
- Re-training



Manufacturer Training

- Application specialist: software and hardware (clinical advice usually excluded)
- To be offered to the whole team
- Details to be clearly defined at time of purchase: time, agenda, documentation
- Should be part of the purchase and not itemized
- Should be a combination of didactic and hands on
- Should be scheduled no more than few weeks prior to procedure implementation

Proctor Training

- To be done by a qualified individual (Radiation Oncologist, medical physicist)
- Clinically oriented training
- Clear agenda of the training prior to procedure
- To be provided to more than one person (valuable for back up and peer review later)
- Opportunity for drafting P.P.
- How to perform the procedure safely and address all possible clinical issues associated with it
- Should be done for a minimum of 3 cases
- Opportunity for proctor to provide feedback to the team on possible improvements



Annual “external” Review

- Should be done on an annual basis for the whole brachytherapy program (required for accreditation)
- Opportunity to evaluate the procedures (simulation, planning, treatment delivery, documentation, QA, calibration, communication, outcome, toxicity, errors)
- Opportunity for improvement

Weekly Peer Review

- Chart rounds (members of the brachy team)
- Tumor board



Professional Associations, Institutions, and Other Manufacturer Training

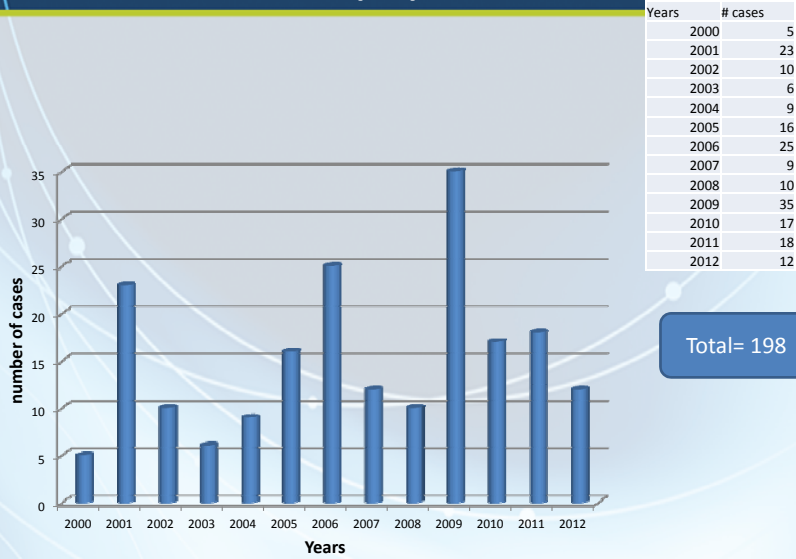
- ASTRO, ESTRO, AAPM, ABS: workshops, schools, and brachy fellowship (ABS for A.U. and QMP)
- Academic institutions (MD Anderson, Memorial, Stanford, Cleveland Clinic, etc...): workshops
- Manufacturers, schools, webinars, workshops

Training Factor and Treatment Errors

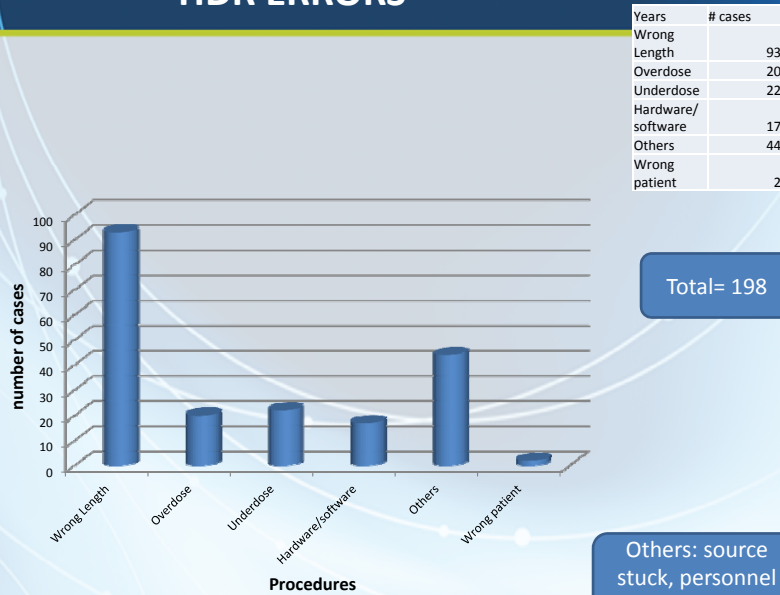
- ACMUI (Advisory Committee on the Medical Use of Isotopes) Report 2011:
 - Rate of M.E. 2009 and 2010: 0.02%
(8 per 33,000 TX)
- Failures to follow departmental guidance
- Human failures in performing tasks



Review of Medical errors for HDR cases 2000-2013 (ZO)

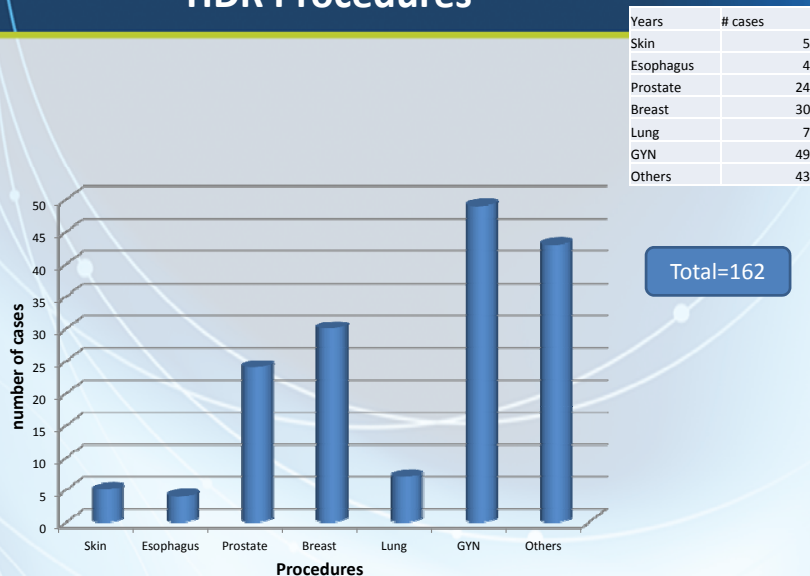


HDR ERRORS





HDR Procedures



Similar Sources of errors from HDR data

- Lack or inadequate training, competency of individuals
- Communication issues
- Lack of documented procedures
- Human errors contribute to more than 80% events
- Equipment issues (hardware and software)
- Others



Types of errors

- Incorrect dose delivery due to:
 - a) Incorrect step size
 - b) Incorrect reference points
 - c) Incorrect treatment setup
 - d) **Incorrect source Indexer length**
- Incorrect body site treated
- Mechanical failure

Why do errors occur? Training factor

- Increased complexity of advancing technology => more opportunities for errors T
- Lack of knowledge, education, information, inexperience T
- Teamwork: poor communication T
- Time shortage/fatigue
- Equipment failure and poor feedback from system T
- Poor instructions/procedures (manufacturers, within) T
- Wrong person doing the wrong task T
- Lack of proper equipment T
- Inattention/distraction T



Why do errors occur? Training factor (Cont'd)

- Poor organizational safety culture (proactive one)
- Poor morale
- Poor supervision/checking T
- Misperceptions of hazards T
- False belief that bad outcomes won't happen to us T
- Emotional state (anger, stress, etc...)
- Power factor/hostile environment

Lessons Learned

- Errors are inevitable and no one is immune
- **Training does not address all issues**
- Look for risks and errors, and do not assume things are correct
- Constructive questioning attitude
- Human factor is a significant contributor to treatment errors
- Evolving technology => new errors replace old ones



Lessons Learned (Cont'd)

- Current approach: evaluate items after an error
- Better approach: investigate processes and applications for potential problems in a continuous way
- Complete testing: pass and fail options
- Identify sources of errors and provide permanent solutions as a team
- Avoid rushing to the use or implementation of something new (device, procedure)?

Can We Learn From Others?

- Reporting errors is a good start but, without additional concrete goals, will not help reduce them
- Report: detailed information of the source(s) of error, conditions, and implemented solutions to assist self and others
- Information should be available in an efficient and rapid way to avoid similar ones from happening elsewhere
- Users meeting session to discuss patient safety/errors, solutions, and improvements



Can We Learn From Others? (Cont'd)

- Create vendor and users website for information sharing (Manufacturer website)
- RO-ILS (Radiation Oncology Incident Learning System) sponsored by ASTRO and AAPM
- Errors should be used as an opportunity for a refresher training and risk audit
- “Near misses” should be available to others to avoid actual ones
- Will events be part of CMS payments in the future?
more events → less payment → better Q.I

When is re-training needed?

- Too many close calls or near misses
- Unexpected patient outcomes
- Not doing enough cases to maintain skills, expertise
- Individuals uncertain about their actions
- Staff not following P&P, Checklists
- New Software/hardware or upgrade
- Wrong person doing the wrong thing
- Staff on rotation
- Patients reminding staff about Tx details



Can You Reduce Treatment Errors?

- Design and implement a good QA
- Implement and use practical checklists (specific not generic)
- Link safety and cost savings (financial)
- Use Root Cause Analysis
- Educate staff about errors and legal ramifications
- Focus on systems and not on individuals
- Learn from mistakes (own and others)
- Focus on staff competency (invest a little now to avoid paying more later)
- Question is not ***“if an institution can afford training their staff”*** but rather ***“can it afford not to train them”***?
- Implement annual peer review
- Seek advice and clarification at all time
- Use published guidelines

Training dilemma!!





Possible Consequences From a Medical Event

- Could have a devastating effect on patients/family and changes someone's life
- Increase staff job-related stress and cause significant emotional distress
- Impact on the facility
- Impact on the modality
- We are human and errors are bound to happen and therefore we need to be vigilant at all times in this field (No matter how good we think we are!)

Remember: No human is infallible

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Thank you