



Impact of Teleradiology on Radiation Protection

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~ EDITORIAL ~

TELEROENTGEN DIAGNOSIS BY MEANS OF VIDEO-TAPE RECORDING*

VIDEO-TAPE recording is a new development for projecting as well as storing motion pictures. The method is based on the same principle as that of the magnetophone, wherein electronic signals emitted by a television camera are registered on a strip coated with ferro-magnetic oxide. The

Within a brief period, teleguided roentgen diagnosis has become a practical reality and may develop into a routine procedure. Video-tape recording implies possibilities far beyond the restricted capabilities of sensitized emulsions. Electronic photography, as it may be called, offers an excellent

Neelie Kroes

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Is there any impact?

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[Paediatric radiology: part I: providing diagnostic imaging to a young population.](#)

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[Some current legal issues that may affect oral and maxillofacial radiology: part 1. Basic principles in digital dental radiology.](#)

4. MacDonald-Jankowski DS, Orpe EC. *J Can Dent Assoc.* 2007 Jun;73(5):409-14. PMID: 17555651 [PubMed - indexed for MEDLINE] [Free Article](#) [Related citations](#)

No dedicated paper on radiation protection

Teleradiology – Range of Applications

- Primary reading (reporting)
- Consultation (second opinion, expert service)
- Patient transfer (between hospitals, private practices)
- Research, clinical trials
- Central registries / repositories for regional eHealth projects
- Education, teaching

Primary Teleradiology

- 24h service, esp. emergency reports for off-hours
- Regions with lower population rates (e.g. Scandinavia, even parts in Germany)
- Shortage of trained radiologists
- Behaviour of radiologists („controllable lifestyle“, Bruce Hillman)
- Normal radiology outsourced to private practices,
 - which don't provide off-hour service
- Workload balance between different sites of same organisation
- Legal regulation in place (e.g. Germany)

Quality Aspects of Teleradiology

- TR mostly provided on contractual basis between hospitals and TR-providers
- Quality criteria part of service level agreements
- E.g.
 - „turn-around-time“ for providing reports
 - Double-reading
 - Analyses of discrepancy rates

Benefits of Teleradiology

- TAT
 - Often shorter than in-house
 - 30min response time requested (e.g. 93% finalized, Wong 2005)
- Double reading
 - Discordance rate 1,09% (124.870 exams, Wong)*
 - <1% (126.449 cases, Agrawal, 2011)*
- Consultation / Patient transfer
 - 5% transfer rate only (Sögner)
 - 17% less follow-up studies (Sodickson)
 - Lower repeat rate for CT with 17% instead of 28 – 58% (Flanagen)
- * both authors rely to Teleradiology-Service Companies

Radiological Procedures

- More than solely image reading, because
 - Identification of medical problem
 - Access to clinical informations and history required
 - Access to priors
 - Decision on appropriate protocol, ev. personalized
 - Reporting
 - Communication with referring physician

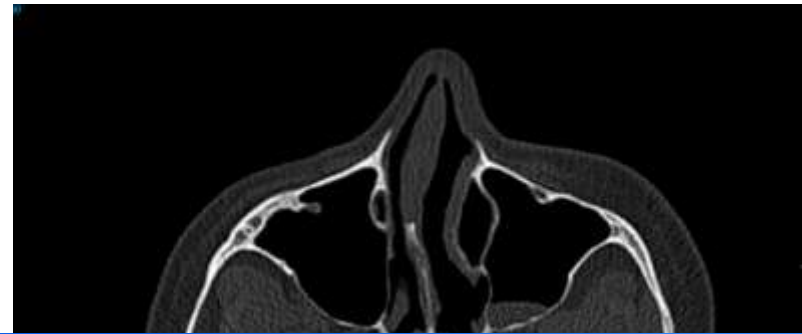
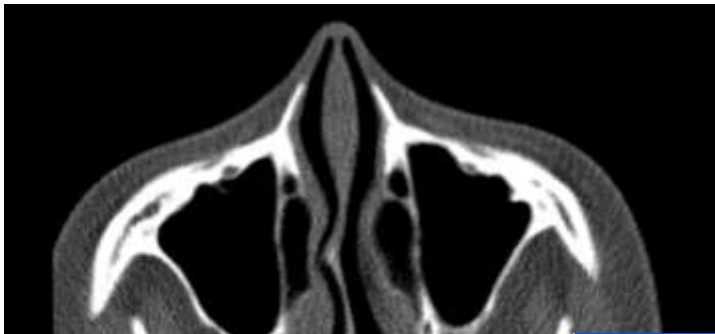
Real and Potential Problems

- **Communication**
 - Clinic-radiological communication
 - Team Working
 - Linguistic Problems
 - Wording of report and clinical impact
- **Access to Previous Examinations**
- **Downstream Costs**
- **Quality Control**
 - **Learning from mistakes** through participation in radiological discrepancy/error meetings.
 - It is difficult for teleradiology services to have a proper **feedback of the outcome** and undertake satisfactory audit of their reports.

Potential Risks of Teleradiology

- Inappropriate protocol
- „Over-examination“
 - More phases than needed
 - Extended region examined by technician
 - No use of dose reduction potential (kV and/or mAs reduction, iterative reconstruction)
- „Under-Examination“
 - Limited reconstructions (slice thickness, filters, MPRs...) only
 - no use of i.v. contrast or even no use of teleradiology in dedicated situations (e.g. pulmonary embolism)

Protocol Optimization



MPPS - Info vom Gerät / nur Anzeige <Schreibschutz>

Übersicht Serienübersicht erw. Dosis-Info Dicom-Dump

Wichtige Untersuchungsparameter

Status: COMPLETED Start-Datum: 06.08.2007
 Anz. Serien: 3 Start-Zeit: 16:54 Uhr

Beschreibung	Werte
Performed Station AETitle	MXIDT
Accession Number	0125786790
Dosis-Kommentar (1)	Series #2 NNH Average CTDIvol=0.4 DLP=6.7
Dosis-Kommentar (2)	Total DLP=6.7
Total Number Of Exposures	2
geplante Untersuchung (1)	2010 CT NNH/ Mittelgesicht
durchgeführte Untersuchung (1)	2010 CT NNH/ Mittelgesicht

DLP 6.7 mGy*cm

MPPS - Info vom Gerät / nur Anzeige <Schreibschutz>

Übersicht Serienübersicht erw. Dosis-Info Dicom-Dump

Wichtige Untersuchungsparameter

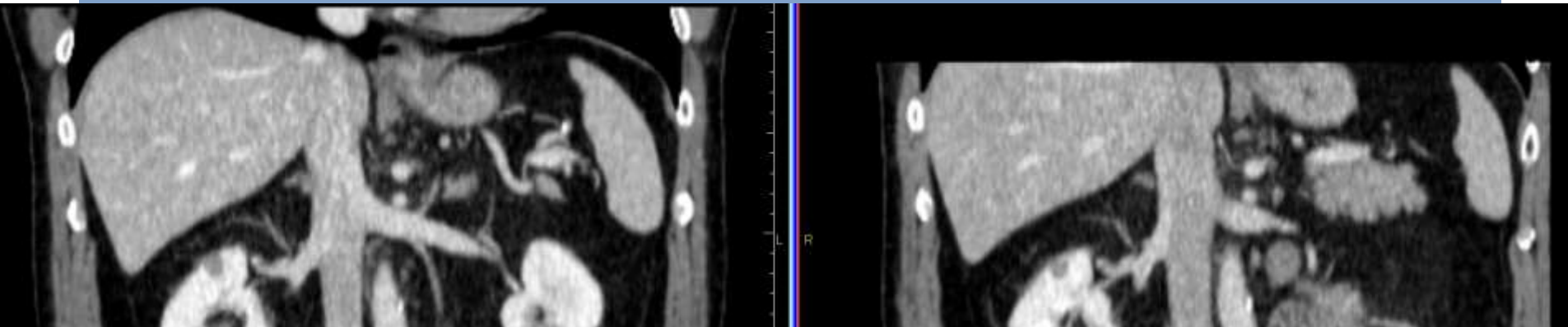
Status: COMPLETED Start-Datum: 12.01.2009 Ende-Datum: 12.01.2009
 Anz. Serien: 2 Start-Zeit: 14:23 Uhr Ende-Zeit: 14:29 Uhr

Beschreibung	Werte
Performed Station AETitle	BR64_605
Accession Number	0129227998
Dosis-Kommentar (1)	Series #2 NNH Average CTDIvol=7.9 DLP=178.3
Dosis-Kommentar (2)	Total DLP=178.3
Total Number Of Exposures	2
geplante Untersuchung (1)	2010 CT NNH/ Mittelgesicht
durchgeführte Untersuchung (1)	2010 CT NNH/ Mittelgesicht

DLP 178 mGy*cm

Schließen

Appropriate Scan Length



MPPS - Info vom Gerät / nur Anzeige <Schreibschutz>

Übersicht | Serienübersicht | erw. Dosis-Info | Dicom-Dump

Wichtige Untersuchungsparameter

Status: COMPLETED Start-Datum: 06.01.2009 En
Anz. Serien: 9 Start-Zeit: 09:16 Uhr En

Beschreibung	Werte
Performed Station AETitle	MXIDT
Accession Number	0128509387
Dosis-Kommentar (1)	Series #2 nativ Average CTDIvol=10.8 DLP=325.0
Dosis-Kommentar (2)	Series #3 locator Average CTDIvol=2.5x1 DLP=2.5
Dosis-Kommentar (3)	Series #4 tracker Average CTDIvol=2.5x6 DLP=15.0
Dosis-Kommentar (4)	Series #5 ART 120-4-BT Average CTDIvol=10.7 DLP=324.7
Dosis-Kommentar (5)	Series #6 PV. Average CTDIvol=10.6 DLP=322.1
Dosis-Kommentar (6)	Total DLP=989.3
Total Number Of Exposures	6
geplante Untersuchung (1)	2300 CT Gesamtabdomen
durchgeführte Untersuchung (1)	2310 CT Oberbauch

DLP 322 mGy*cm / scan

MPPS - Info vom Gerät / nur Anzeige <Schreibschutz>

Übersicht | Serienübersicht | erw. Dosis-Info | Dicom-Dump

Wichtige Untersuchungsparameter

Status: COMPLETED Start-Datum: 16.09.2008 Ende-Datum: 16.09.2008
Anz. Serien: 10 Start-Zeit: 10:53 Uhr Ende-Zeit: 11:11 Uhr

Beschreibung	Werte
Performed Station AETitle	MXIDT
Accession Number	0127838157
Dosis-Kommentar (1)	Series #2 nativ Average CTDIvol=5.9 DLP=143.1
Dosis-Kommentar (2)	Series #4 locator Average CTDIvol=2.5x1 DLP=2.5
Dosis-Kommentar (3)	Series #5 tracker Average CTDIvol=2.5x15 DLP=37.5
Dosis-Kommentar (4)	Series #9 locator Average CTDIvol=2.5x1 DLP=2.5
Dosis-Kommentar (5)	Series #10 tracker Average CTDIvol=2.5x11 DLP=27.5
Dosis-Kommentar (6)	Series #11 ART 120-4-BT Average CTDIvol=10.9 DLP=276.6
Dosis-Kommentar (7)	Series #12 PV. Average CTDIvol=10.7 DLP=269.5
Dosis-Kommentar (8)	Total DLP=759.2
Total Number Of Exposures	8
geplante Untersuchung (1)	2310 CT Oberbauch
durchgeführte Untersuchung (1)	2310 CT Oberbauch

DLP 269 mGy*cm / scan

Potential Risks of Teleradiology - II

- Limited communication between referring physician and tele-radiologist (even not known who is reading, „ghostwriting“)
- Different styles of reports by different radiologists
- No systematic improvement program for protocols
- Trend to more defensive or vague reporting or many differential diagnosis
- Could imply other imaging and/or invasive diagnostic follow-up



Main Menu

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Recent News

- [2008/9/22] New focus
- [2008/5/22] R-Bay presented to US-mil...
- [2008/5/9] Baltic eHealth Network w...
- [2008/5/9] Exposure!
- [2008/5/9] The R-Bay project is well...
- [2007/9/3] R-Bay in Estonian media

Internal

- Internal Site
- Partner Reporting

Welcome to the R-Bay homepage

The R-Bay project

R-Bay is an EU-funded market validation project under the eTEN programme. The project has eleven partners from eight European countries.

The **R-Bay** project aims at establishing an online **eMarketplace** within the field of radiology, i.e. an eMarketplace for the buying and selling of imaging related eHealth services. **R-Bay** paves the way for the creation of an internal market for exchanging eHealth services and this will lift the sharing of healthcare resources to a new dimension within a pan-European scope.

The **R-Bay** services will be tested in 6 field trials each consisting of a customer and a clinical provider. The concept to be validated, under real market conditions, is an eRadiology service portfolio, which delivers imaging related services in a new way. The portfolio consists of four services: **eInterpretation**, **eProcessing**, **eArchiving** and **eTraining**.

The four services are all included in the overall **R-Bay** service because they together offer an efficiency improvement of the clinical process. eInterpretation is the primary service as it is the actual solution for networked eCollaboration. The additional three services are technical solutions that support eInterpretation.

Status of the R-Bay project

September 2008

The **R-Bay** project has gone through a re-organisation period over the summer and has redirected itself to merely have focus on how to build up a business around the **R-Bay** portal for cross-border imaging service.

This means that special focus now must be paid towards the commercial aspects of the project.

Currently, the clinical quality and workflow of the **R-Bay** portal is being tested to prove the sustainability of it. In the end, it is expected that **R-Bay** will in the near future be able to offer potential customers (hospitals, remote reporting companies, private clinics etc.) a portal providing one point of entry to the radiology market.

„Teleradiology Ghosting“

Clinical Innovation + Technology

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Teleradiologist found guilty of fraud



A federal district court has convicted 41-year-old Radiologist Rajashakher P. Reddy, MD, of more than 30 counts of fraud and obstruction of justice in connection with his signing tens of thousands of radiology reports that neither he nor any other physician actually viewed.

Over the course of eight months between 2007 and 2008, Reddy was found to have signed 70,000 reports despite having viewed digital images only 5,900 times during that period, according to the U.S. Attorneys Office for the Northern District of Georgia. Reddy ordered radiology practice assistants, at his Atlanta-based teleradiology group Reddy Solutions (RSI), to prepare and even sign many of the reports delivered to hospitals located in Georgia and Alabama.

Evidence presented at trial showed that for some reports with Reddys signature, he was traveling on airplanes without internet access and had provided his account information to non-physician technicians to complete the reports.

Reddy was indicted in 2009 with 37 counts of fraud and obstruction of justice, including charges that he ordered the destruction of evidence by RSI employees. After a six-day trial and one day of deliberation, the Georgia jury, on July 8, convicted Reddy of 20 counts of wire fraud, five counts of mail fraud, four counts of healthcare fraud and one count of obstruction of justice.

ESR Position

- ESR Position Paper on Teleradiology, 2006 (update from 2004)
- ESR White Paper “Teleradiology in the European Union” ,
November 2006
- ESR Response to the EC Communication on Telemedicine,
2008
- ESR Response to the Council Common Position re. the cross-
border healthcare directive, 2010
- Dedicated Subcommittee on e-health
- Update of Position Paper is Work in Progress



ESR Position

- Legal clarity
 - A legal framework related to teleradiology and common to all Member States would pave the way to the trusted development of teleradiology as a medical practice
- Full information of patients & informed consent
 - The ESR strongly advocates that the patients need to give informed consent before teleradiology is performed and receive full information that their health data are transferred to another country and that their images are being reported or consulted by individuals who have had no direct contact with the patient.
- Importance of interoperability and standardisation
 - Having the relevant ICT infrastructures (e.g. broadband availability for all) with consistent attention to the implementation of measures aimed at ensuring respect for the right to protection of personal data.



Conclusion

- TR could enable expert diagnostic services world-wide
- TR relevant to avoid repeated imaging
- TR relevant to avoid unnessecary patient transfer
- TR has implications for resident´s training and core activities
- TR should be recognized as a medical act and not as a commodity
- Regular communication of radiologists with reffering physicans („hub-concept“) should be mandatory
 - RSNA 2012: „Patients First“