BY KATHARINA MIEDZINSKA

Broken, swollen, bleeding: how to deal with head and neck emergencies

In a dedicated Special Focus session at ECR 2018 today, three experts will illustrate the difficulties and challenges they face in the management of head and neck emergencies.

In today's session entitled 'Head and neck emergencies', Dr. Elizabeth Loney, a consultant radiologist at Darlington Memorial Hospital, U.K., will discuss the imaging and reporting of such cases. Trauma to the head and neck is a common reason to visit the Emergency Department, ranging from minor facial injuries to life threatening airway compromise. As the true extent of the patients' injuries may not be readily apparent, early diagnosis and appropriate management is facilitated by accurate imaging assessment. This guides preoperative planning to reconstruct facial buttresses thus restoring form and function and permitting early rehabilitation. In her presentation, Loney will concentrate on maxillofacial fractures, touching briefly on temporal bone and orbital injuries and finishing with traumatic lesions of the larynx, with particular focus on thin slice helical CT using multiplanar reconstructions (MPRs) and 3D reformats.

"There is a lot to consider when evaluating craniofacial injuries," Loney noted. In this regard she plans to familiarise ECR delegates with a 3-step reporting system for ask yourself the question 'Are the pterygoid plates intact?' If not, you are looking at some type of Le Fort pattern injury," she said.

The Le Fort group of fractures involves either complete or partial detachment of the maxilla from the skull base. In patients with a Le Fort

3D CT of a Le Fort II/pyramidal fracture.

I fracture the hard palate is detached from the skull (a 'floating palate'), whilst in patients with a Le Fort II injury, fracture lines include orbital margins, and in Le Fort III cases there is complete dissociation of the midface from the skull base. Exclusion of Le Fort II and III fractures is extremely important when evaluating patients with facial trauma, as these patterns are associated with an increased risk of cervical spine and intracranial injuries.

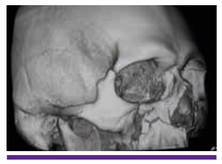
"After excluding a Le Fort fracture, the next step is to evaluate whether nasoorbitoethmoid (NOE) or zygomaticomaxillary complex (ZMC) fracture patterns are present. The final step involves excluding isolated fractures (e.g. orbital and mandibular) and soft tissue injuries," explained Loney.

"When confronted with a complex facial trauma CT scan, often in

3D CT of a Manson Type 1 NOE fracture.

the early hours of the morning, it is crucial to have a 'system'," Loney emphasised. "It is so easy to produce long, complex reports which are essentially lists of fracture lines, rather than a concise, helpful report which will really change management. Hopefully this presentation will help radiologists to report such examinations, regardless of the mechanism of injury."

Dr. Loney is the current President of the British Society of Head and Neck Imaging, which, on September 27–29, 2018, will hold its annual meeting in collaboration with the European Society of Head and Neck Radiology (ESHNR) and the British Society of Dental and Maxillofacial Radiology (BSDMFR) in London, at the Royal Geographical Society. "This promises to be an exciting event attracting prestigious international speakers with a great social programme at an historic venue, adjacent to the Royal Albert Hall and close to London's famous National History and Science Muse-



3D CT of a ZMC fracture pattern. All images provided by Dr. Elizabeth Loney

ums in Kensington," she said. For further details and to register go here: www.eshnr.eu.

Also in this session, Prof. Minerva Becker, from the division of diagnostic and interventional radiology at the Geneva University Hospital, Switzerland, will address infections of the base of the skull and familiarise ECR delegates with imaging techniques to use in case of infections and inflammations in the emergency setting. Specifically attendees will discover the diversity of soft tissue infection patterns and pathology that may be present in the emergency setting.

Last but not least, Dr. Damien-Arthur Varoquaux, from the department of medical imaging at the Marseille University Hospital, France, will discuss vascular blunt and penetrating traumatic injuries, highlighting in particular the role of interventional radiologists in the treatment of epistaxis and tumours in the emergency setting, vascular malformations, and endovascular treatments.

The concluding panel discussion will focus on the question of whether the radiologist is an essential component of the emergency team.

Special Focus Session

Friday, March 2, 16:00–17:30, Room N
SF 12c Head and neck emergencies

» **Chairperson's introduction**
R. Kohler; Sion/CH

» **What is broken?**
E. Loney; Darlington/UK

» **It is red and swollen ...**
M. Becker; Geneva/CH

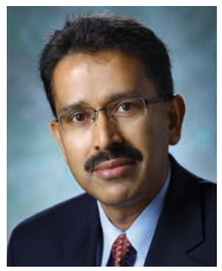
» **It is bleeding ...**
D.-A. Varoquaux; Marseille/FR

» **Panel discussion: Is the radiologist an essential component of the emergency team?**

BY REBEKAH MOAN

A to Z of radiation dose management, courtesy of EuroSafe Imaging campaign and EFOMP

It lingers in the back of every radiologist's mind: radiation dose. How can you lower dose? How do you track it? What's the standard and acceptable level for a procedure? Luckily for ECR 2018 delegates, today's presentations on dose management systems and repositories, organised by the European Federation of Organisations for Medical Physics (EFOMP), will answer all of those questions and more.



Prof. Mahadevappa Mahesh, from Johns Hopkins University School of Medicine in Baltimore, U.S., will moderate the second of today's sessions on dose management systems.

Jenia Vassileva, PhD, a radiation protection specialist who is affiliated with the International Atomic Energy Agency, will talk about dose monitoring today.

Specifically at the congress, the EuroSafe Imaging campaign will unveil a clinical decision support tool to help radiologists choose the right procedure. It will also publish the updated EuroSafe Imaging Call for Action, which reflects the group's goals and activities for the coming years.

Prof. Guy Frija, chair of the EuroSafe Imaging steering committee, will provide updates on the campaign, such as the implementation of the European Basic Safety Standards Directive (2013/59/Euratom), the development and piloting of the ESR Audit Tool, the revision of the EuroSafe Imaging Stars concept, the development of clinical diagnostic reference levels (DRLs), and education activities.

"Technological and scientific developments have led to a remarkable increase in radiation exposure," he told *ECR Today*. "Dose management tools have positive implications to tackle this issue. However, these tools are relatively new and the practical impact varies."

One of those tools is dose-monitoring software, which is an electronic, automatic system that collects and analyses dose-related data. The software allows for a precise internal audit of dose, but it mainly depends on imaging protocols. Those protocols are designed from an anatomical orientation without taking into account the clinical context, he said.

"Dose-monitoring systems could therefore be a helpful tool for establishing new dose reference levels based on the clinical indications and on the patient's specific characteristics, driving the actual DRL based on anatomy toward clinical DRLs," added Frija, who is a professor emeritus of radiology and consultant at the Paris Georges Pompidou European Hospital.

Furthermore, tracking software can play an important role in dose optimisation, influence behaviour, and support quality improvement initiatives. It allows for the review of protocol use – both frequency and appropriateness – and optimisation of protocols, as well as supports dose awareness in general.

It's important to note dose monitoring may be used in two ways, she explained. In the first, data are collected at the level of a population of patients undergoing imaging exams, and patient identification is not needed. The analysis takes on a statistical nature, as the data would reflect variability across the population cohort. The second way to use dose monitoring is to track individual patient exposure histories, for which patient identification is needed.

"The dose quantities provided by the equipment are related to the dose received by the patients, but they can't be indicated as patients' dose," Vassileva said. "To proceed with further use of these data for dose optimisation or estimation of patient-centric dose quantities, more information is needed, including patient data as well as procedure data. The level of completeness for patient exposure data should take into account the final scope of the data collection, and using them for optimisation of clinical protocols or for temporal tracking of changes, or estimation of patient-centric dose/risk quantities like organ doses."

It's effective to monitor dose in such a way, but the effectiveness grows exponentially when all systems in a particular hospital are connected, which allows for inter-system comparison, optimisation, and standardisation.

"The next level is to connect systems in a group of hospitals in a region, country, or even different countries, which would allow for establishing DRLs, benchmarking, and comparison," she pointed out.

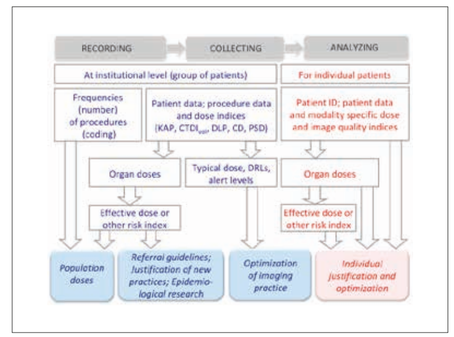
That next-level connection is precisely what's occurring in the U.S. with the American College of Radiology (ACR) dose index registry. The registry started in 2011 and contains more than 42 million exams/82 million scans from 2,800 sites across the U.S., according to Prof. Mahadevappa Mahesh, from Johns Hopkins University School of Medicine in Baltimore, Maryland.

When facilities use the registry, they receive a personalised report. More importantly, the report also demonstrates how the facility performs with respect to local hospitals, states, and nationally, and that information may be used to determine if a facility is in the average range. If it is not, then a readjustment can be made.

"Recently the ACR published about 10 standard DRLs for CT protocols," he said. "We've been talking about DRLs for a long time, but it was hard to establish because there was no central database."

Because of the central database, the ACR was able to publish common DRLs and provide a national standard. And even though Mahesh plans to focus on the U.S. perspective, it is relevant to a European audience as well because he will delve into the practical aspects of setting up a dose index and how the ACR tackled those challenges.

"If any other countries want to set up a similar database, they will face similar challenges," he said. "I also want to encourage facilities to sign up for it not only for regulatory purposes. It helps to re-evaluate data on a regular basis."



Schematic presentation of the exposure-monitoring process. Image provided by Jenia Vassileva, PhD.

EFOMP Workshops (European Federation of Organisations for Medical Physics)

Friday, March 2, 08:30–10:00, Room G
EF 1 Dose management systems and repositories: part A

Moderators: J. Damilakis; Iraklion/GR
A. Trianni; Udine/IT

» **Chairperson's introduction**
J. Damilakis; Iraklion/GR

» **The 'EuroSafe Imaging' campaign's point of view**
G. Frija; Paris/FR

» **Strategies for dose management for achieving optimised imaging**
J.N. Vassileva; Vienna/AT

» **The benefits of dose management systems in view of the new Euratom Directive**
V. Tsapaki; Athens/GR

Friday, March 2, 10:30–12:00, Room G
EF 2 Dose management systems and repositories: part B

Moderators: M. Brambilla; Novara/IT
M. Mahesh; Baltimore, MD/US

» **Chairperson's introduction**
M. Brambilla; Novara/IT

» **Organisation of dose management systems and repositories for radiation protection and biomedical research: possibilities and limitations of current implementations and standards**
B. Gibaud; Rennes/FR

» **Imaging and dose repositories: tools to boost radiation protection and research?**
E. Neri; Pisa/IT

» **The ACR dose index registry: setting a benchmark**
M. Mahesh; Baltimore, MD/US

These sessions are part of the EuroSafe Imaging campaign.