

## Call me Giovanni – A day in the life of a radiologist

Call me Giovanni. A few minutes ago – never mind how long precisely – my alarm clock rang. It is about 6:30am and I have to go to work. I live downtown, not too far from the hospital. I am a radiologist working at the Emergency Department and I have to be there at 8 o'clock to start my morning shift. Today, I will have to take care of all patients sent for a computed tomography (CT) scan, another colleague will deal with plain film x-rays, and we will have to share the workload in ultrasound (US). Emergency radiology is a job I like: you have to deal with acute (suddenly arising) cases, you can, hopefully, provide a great contribution to solving their problems and you feel you are important for these patients. Furthermore, all radiologists in the emergency department have been able to create a good feeling with our colleagues specialising in other areas of medicine. Emergency physicians respect our opinion and rely, maybe too much, on our diagnostic skills. It is stressful (too many patients, always in a hurry), but it is a satisfying profession.

As always, traffic jams are a problem in the morning, but I have been able to arrive on time. There are already four patients on the list today. They arrived at the hospital during the night and were not emergencies, so they were able to wait until my arrival. Taking a look at the request forms, there is a patient with a bad fracture of the knee; the orthopaedic surgeon requests a CT examination to plan his operation. One is an old lady with a very swollen abdomen due to a suspected intestinal obstruction. Another patient has renal colic (abdominal pain originating from the kidneys) and is obese. The last patient is a 17-year-old girl with suspected acute appendicitis; I will first do an ultrasound examination on this patient and then decide whether to proceed with a CT scan or not. There are no neurological cases (patients with a problem relating to the nervous system) for me, since in my hospital neuroradiologists have their own patients; their CT area is just 50 metres from here.

Let's start. I call the technician and the nurse and ask them to let the first patient come in. My reading space – the area where I study the images resulting from the examination – is just behind the control room of the CT scanner. I work quite closely together with the technician who operates the equipment and the nurse who takes care of the patient. I know there are different ways of working, but I like this continuous contact with my co-workers: we are a team. I make a quick check of the patient's chart and decide on the scanning technique. Some patients require an injection of a substance called 'contrast medium', which helps to make certain things more clearly visible in the image, but this isn't necessary for my first patient. I will have to prepare some 'nice' 3D images for the orthopaedic surgeon; they say they are quite useful in planning their surgical approach. The CT image shows it's a bad fracture. He will have to work hard to put all the fragments back together; good luck to both surgeon and patient! I see they plan to operate on him tomorrow, so I can postpone my report to the end of the day. The second patient is the old lady; she needs a contrast-enhanced examination, which means using contrast medium. She's old, and may have other medical conditions in addition to the current complaint. The function of her kidneys has already been checked with a blood test, and from the chart it looks ok, so I can proceed with the contrast injection; but first I have to talk with her and get her informed consent for the injection. In my country, this is a duty of the radiologist and we have to keep the signed informed consent form with the patient's charts. I decide on the scanning technique and let her in. The nurse has some problems in finding a suitable vein for the injection, but she is an expert and she manages. The scan is finished in a few minutes and the images arrive at my workstation.

Wow! The cause of the intestinal obstruction is an *obturator hernia*! This is rare, and difficult to diagnose without imaging. No wonder they did not spot it when she came in tonight. I must write down the report immediately and make a phone call to the doctor who referred the patient to me; they have to call surgery and operate on her soon. The hernia is causing dilatation of the loops of the small bowel, but their walls do not show signs of permanent damage. The prognosis does not look bad.

While I am writing the report, the technician and the nurse have already finished scanning the patient with the kidney-based pain; the technician knows exactly which low-radiation procedure to use in this kind of study, there was no need to tailor the examination for this specific patient. A quick scan has shown a 7mm stone at the middle third of the right ureter, which is the tube that leads out of the kidney to the bladder. Diagnosis done. But I always wonder if all these stone studies are really necessary. Most, if not all these patients, need a 'standard' therapy: analgesics, fluids, and anti-inflammatory drugs. Most stones pass spontaneously in a couple of days, but patients have pain and they want to know the reason why. Urologists prefer to decide immediately which cases they have to admit and which can be sent home. It is always a battle. This was an obese patient and it would have been difficult to examine him with ultrasound, but I usually prefer to start with an ultrasound study in cases of suspected renal colic. For more than 50% of these patients, we can often work out the problem while avoiding any radiation exposure.

A phone call informs me that the girl has arrived in the US examination room. It is time to go. She is already on the examination table: a quick "good-morning", "where does it hurt?", "don't worry, I won't harm you, I will just need to put some gel on your belly", and the examination starts. She is a lean girl, easy to study. The inflamed appendix is easily visible. The report is ready in a few minutes. At this time, two additional patients are waiting outside the examination room, and a phone call invites me to come back to the CT station: two more patients have arrived. The two rooms are next to each other, so I can manage. I ask the nurse to let in one patient who is here for a US examination, and I go to the CT. These are two follow-up examinations from the oncologic clinic (we have to take care of some of their requests during our daily work). Both patients were already here a few months ago. I remember one of them. The technician knows the examination procedures to be used in these cases; I let him and the nurse work with them and go back to US. The first patient has come due to upper abdominal pain; I see a stone pressing against the neck of the gallbladder but the walls are not thickened and there is no tenderness at the base. And there are no other anomalies within the abdomen. The second patient is more of a concern: he has been admitted early this morning with jaundice. There is a mass at the head of the pancreas and the bile ducts are dilated. This is a serious problem; it looks like a pancreatic tumour. I can see the lesion completely surrounds a major vein; this is bad finding, as the lesion does not seem surgically removable. In the report, however, I suggest a CT exam to provide accurate and complete analysis; it will be probably done in the late morning or this afternoon, before sending the patient from the emergency department to a ward for palliative treatment. In the CT waiting room, two new patients have already arrived from the emergency room. A check of their charts, a chat for their consent to contrast injections ... but, while the first is ready to enter the examination room, there is a phone call informing me that an emergency patient has just arrived. The emergency physician informs us that he will arrive within 15 minutes. If I hurry, there is just enough time to examine one of the waiting patients! As soon as we are finished, the emergency is at our door. The patient is on a stretcher, is receiving breathing assistance, and is covered in life-support devices. We have to examine him from head to toe. He fell from a ladder while at work. A head injury is suspected, plus there are signs of chest and pelvis injuries and an exposed fracture of the right leg. We do the examination. I send the head images to the neuroradiologist and start looking at the body. There are fractures at the shoulder and a few ribs, some bruising to the lung, bad fractures of the pelvic bones, with blood infiltration within the pelvic muscles, and there is fluid in the abdomen. Stop! Don't take him out of the scanner! I need to do another scan. Fluid in a patient with pelvic fractures can be urine from a ruptured urinary bladder. We need a late scan to see if the contrast medium we have injected passes into the peritoneum (which is the lining that covers most of the abdominal organs). In the late images I see the fluid shows the typical signs of urine, which must be from a ruptured bladder. This means the patient has to be assessed by a multidisciplinary team including the urologic surgeon. I need to make a note of this study and keep the images for teaching the trainees. The neuroradiologist says the patient is ok for her: no head or spinal cord injury. He has enough trouble already without neurological ones!

Back to ultrasound: there is a young man with renal colic, and I can see a stone at the junction of the tube leading from the kidney into the bladder. The outlook for this patient is good. There is also a case of a painful lump in the neck that developed during the night: it is a thyroid cyst. The patient can go back to her family doctor; there was no need to come to emergency. It is almost noon. I get a coffee from the automatic machine and go back to CT. Three other patients: an old lady with a suspected blockage in the artery that transports blood to the lungs and a sudden onset of shortness of breath; a patient with an aneurysm of the abdominal aorta who needs to be checked before surgery (it seems they sent him to emergency radiology because they think we have no waiting list!); and a patient with blood in his urine, in whom my colleague has seen a mass in the kidney during a US examination. It is probably a tumour. The patient needs a 'staging' examination, to precisely determine the extent of the mass, before surgery.

Two more US exams and my morning has gone! Another case of appendicitis; easily visible, no need for CT. The last patient is a young lady with acute and strong pelvic pain: she has a mass on the right side with both solid and liquid components, and a small amount of loose fluid. But her pain is on the left side. Could it be a cyst that has become twisted? Quite often a twisted mass may move from its normal position. I must suggest the diagnosis and talk with the gynaecologist: if it is confirmed at his visit they need to operate on her quickly. It is 2pm. The radiologist on duty this afternoon has arrived. I still have to spend some more time at my workstation; I need to finish and sign all the reports that are still open, make a few phone calls and go to prepare my lesson for the radiology trainees tomorrow; the first in a series on emergency radiology, called *Roles and responsibilities of the radiologist in emergency care*. There is quite a lot to say.