

# Different Needs, One Approach

Two hospitals in Ticino, Switzerland, one serving an urban area of 150,000 people, the other a town of about 15,000, confront the demands of an ageing population, increasing patient loads, and disruptions in patient scheduling when emergencies arise. Can a new approach make them increasingly efficient and attractive?

Text: Claudia Flisi | Photos: Mattia Vacca



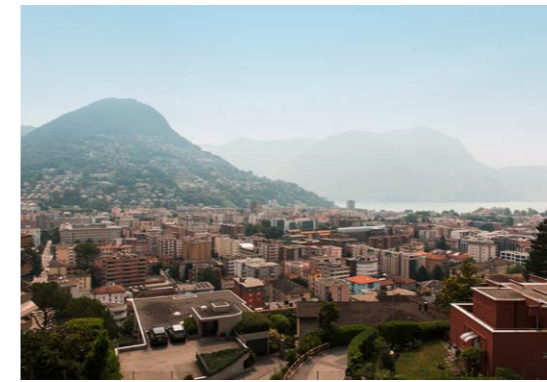
Filipo Del Grande, MD (left), Ermidio Rezzonico (mid), and Matteo Merli, CAT scan technician, Ospedale Regionale di Lugano (right), regularly share ideas how to manage processes to maximize efficiency, remain competitive with other hospitals in their market, and solidify a good reputation to attract patients and staff.

**N**estled among alpine trees in a green valley by Lake Lugano is the Ospedale Regionale di Lugano – Civico e Italiano (Lugano Regional Civic Hospital). It is part of the EOC, the L'Ente Ospedaliero Cantonale of Ticino, Switzerland, and epitomizes the crisp modern efficiency

of Switzerland's medical system, one of the world's best, operating in one of the world's wealthiest countries. Lugano's patients are sophisticated – and older than the patients of an average regional hospital: Swiss men are the longest living in the world, according to the OECD, and Lugano is located

in Ticino, with the country's oldest population.

Kidney disease, gout, stroke, heart attacks, and other cardiovascular ailments are common in such ageing populations. So the hospital is particularly attentive to these diseases. When



The hospitals in Lugano and Locarno in Switzerland confront the demands of an ageing population, increasing patient loads, and disruptions in patient scheduling when emergency arise.

a patient comes in with suspected kidney stones, for example, the standard procedure has been to ask him or her to filter his urine and “catch” a stone. The stone is analyzed and a therapy prescribed, based on the composition. A diagnosis of gout conventionally begins with an injection of contrast fluid in the patient's knee to observe the crystal deposits that characterize the disease. A pulmonary embolism diagnosis usually starts with a scintigraphy, which makes injection of a radioactive tracer into the body necessary.

None of these procedures are “pleasant” and all can be time-consuming, taking away time from personal physician-patient interaction. This is an issue for older patients, since the elderly expect more personal attention from physicians and hospital staff than their younger counterparts.

A similar situation confronts a smaller regional hospital in northern Ticino, Ospedale Regionale di Locarno. It is a linear grey 200-bed in-town general hospital set near the northern nose of Lago Maggiore, and serves a local community of 15,000. “We have a little of everything,” explains Jürgen Heinkel, MD, Chief Radiologist in Locarno. He oversees a radiologist and two technicians specializing in CT exams.

By contrast, Lugano's Civico has 300 beds, hosting patients with major medical problems such as trauma, neurology, stroke, vascular issues, and abdominal surgery.

Both Lugano and Locarno are part of EOC – the others being Ospedale Regionale di Bellinzona e Valli, Ospedale Regionale di Mendrisio, Clinica Riabilitazione di Novaggio, Istituto Oncologico della Svizzera Italiana, and Neurocentro della Svizzera Italiana.

## Two hospitals, similar needs

The differences and similarities of the two regional hospitals coalesce in several common needs: managing processes to maximize efficiency, remaining competitive with other hospitals in their market, and solidifying a good reputation to attract patients and staff. Like all Swiss hospitals, both facilities adhere to strict national rules regarding standardized medical protocols and low radiation doses, so acquisitions must facilitate adherence.

The right equipment purchases can help address these needs and specifications. Lugano has had a top-of-the-line imaging device since 2010 with the SOMATOM Definition Flash, frequently used for cardiology patients. Problems arose when the needs of scheduled patients conflicted with emergency situations, and so the hospital decided to supplement existing equipment to minimize such disruptions. It planned to locate this new addition by the emergency room, but expected to use it for kidney, gout, and vascular patients and others as well.

Locarno was looking to replace an older imaging device with something newer and faster, and planned to redesign the physical layout of its radiology department to accommodate its increasing patient loads. It had one changing room; it wanted to add a second – provided the equipment which was fast enough to handle the load.

Since older patients have more metal prosthetics, such as artificial limbs or teeth, both hospitals shopped for imaging equipment that would not be compromised by metal artifacts.

## Improved appointment process and patient flow

Between 2016 and 2017, EOC decided to purchase a Siemens SOMATOM Definition Edge CT, equipped with TwinBeam Dual Energy (TBDE), for each of the two hospitals. Lugano already had a SOMATOM Definition Flash and bought the SOMATOM Definition Edge to replace an older Siemens model.

Lugano was familiar with the technology and its advantages: sharp contrast images, minimal doses, metal artifact versatility, and versatility with a variety of optional applications. The purchase was made with Emergency



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Radiology (ER) use in mind, and has dramatically improved patient handling, according to Filippo Del Grande, MD, Chief Radiologist. His Head of Medical Technicians, Ermidio Rizzonica, seconds his observation: "With the Edge we improved our appointment process and our overall management of patient flow. The impact has been very positive."

While the SOMATOM Definition Flash would continue to be used for cardiology patients and pre-programmed exams, the SOMATOM Definition Edge was installed near the emergency room. The idea was to use it in the ER so that programmed patients would not suffer scheduling disruptions when emergencies happened. The result has been a net improvement in patient flow.

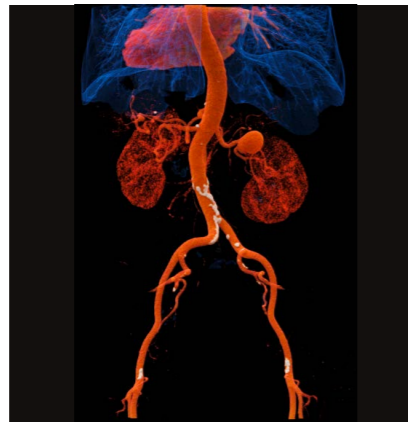
Locarno had seen the advantages of dual energy in Lugano and foresaw a mixed use: emergencies and also programmed visits for – among other applications – gout, kidney stones, pulmonary embolisms, and cardio-vascular pathologies. Patient satisfaction was a main reason for this acquisition. "The patient is our center of attention. So any new equipment we purchase must have a benefit for the patient," explains Heinkel. "It was clear from

the introduction of dual energy that it offered something more for the patient from a diagnostic point of view."

## Diagnostic applications for gout and kidney stones

Two of the most outstanding benefits are the Dual Energy post-processing applications for gout and kidney stones, which can be applied in conjunction with the TBDE technology. Gout is characterized by crystal deposits of urine acid; the common procedure was to inject contrast fluid into the knee so the doctor could observe those deposits. A CT scan with TwinBeam Dual Energy technique enables gout imaging without liquid contrast. This makes a real difference for patients with renal deficiency, who cannot easily tolerate contrast fluid. "Normal" patients also are happier without a knee injection.

The impact on kidney stone diagnosis is more dramatic. Ninety percent of kidney stones are composed of calcium oxalate, ten percent are uric acid;

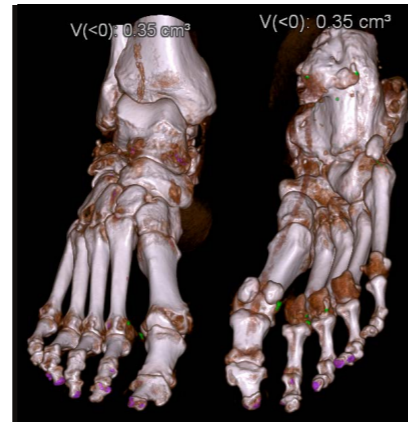


A cinematic rendering image shows the posterior view of the abdominal aorta and its branches, with a renal aneurysm present on the right – please read the details in the case report on page XX.

the prescribed therapy varies, depending on composition. Oxalate calls for breaking down the stones internally, acid calls for medicinal treatment. A CT scan with TBDE technique enables a spectral analysis that identifies this chemical composition. "Clinically this is important," says Heinkel. "Before the CT scan with TBDE technique we had to wait for the stone to be expelled, then do a chemical analysis in the lab. For the patient this was very inconvenient; you had to try to catch the stone during urination. We used to do an x-ray, then ultrasound, then a CT scan. Now we start with the CT scan with TBDE technology, and it is often the only exam needed. We can locate the stone precisely and see the damage it is causing."

## A multitude of other applications

Another application can reveal the damages done by pulmonary embolisms. Before the TBDE technology, radiologists in Ticino might have ordered a scintigraphy, an invasive technique requiring the injection of a radioactive tracer into the body. The TwinBeam Dual Energy approach and corresponding Dual Energy Applications substitutes this procedure in cer-



DECT images reveal small discrete uric acid deposits next to the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> metatarsophalangeal joints – please read the details in the case report on page XX.



With their modern technical equipment, it is easy for Alberto Manar and Jürgen Heinkel, MD to maintain higher dose standards than the national minimums.

tain situations. The Edge is also much faster than the previous CT scanner thanks to the fast pitch of 1.7. "We have gone from 6 to 7 seconds down to 1.8 seconds per scan," reports Alberto Manara, the technician responsible for CT exams in Locarno.

Dual energy minimizes interference from metal prosthetics, common in an aged population. Older patients also have more need for vascular exams, and the elaboration of such data is reconstructed easily and precisely with the SOMATOM Definition Edge, according to Manara.

## The benefits of standardized protocols

The SOMATOM Definition Edge in Ticino has improved services for staff as well as patients. "Having the same machines allows us to be more cost efficient, achieve critical mass, and standardize results from one facility to another," notes Del Grande. Like all Swiss hospitals, the facilities in Lugano and Locarno adhere to strict national rules regarding standardized medical protocols and low radiation doses, so acquisitions must facilitate adherence.

Similar equipment facilitates the Swiss approach, because protocols can be

more easily standardized. The same is true for training of technicians. Staff can be more easily rotated among hospitals. Both Rizzonica and his colleague Matteo Merli, CAT scan technician, Ospedale Regionale di Lugano note that learning TBDE and the corresponding Dual Energy applications was easy because of Lugano's experience with the SOMATOM Definition Flash. "We have always worked with Siemens equipment, so the same user interface, same applications and protocols speed up and facilitate the learning phase," says Rizzonica.

## Lower radiation doses than legally required

The Swiss passion for protocol is rivaled by their focus on dosage. Ticino hospitals maintain higher standards than the national minimums because

they easily meet the minimum requirement. "What is important is to provide optimal images with low radiation doses," notes Heinkel. After more than a year of working with the SOMATOM Definition Edge, he says that his department is using on average 1/3 the dosage used with previous equipment. "This is significant for cancer patients who sometimes have to do several exams every year," he points out.

The arrival of Dual Energy in Lugano alone has resulted in a doubling of CT scans over the last 10 years, from 8,400 in 2006 to 17,000 in 2016. Speed, improved workflows, applications, multiple machines, and wider use of CTs help explain this increase. Patient satisfaction is also a driving force.

"We can spend more time with our patients, so we have no trouble attracting new ones," summarizes Del Grande. ●

Based in Italy, **Claudia Flisi** has written about the intersections of science and technology for the International New York Times and many other publications.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.

TwinBeam Dual Energy is commercially available on SOMATOM Definition AS+ and SOMATOM Definition Edge. It is also available as a field upgrade for these systems.

## A Winning Combination

Swiss law requires a bidding competition for hospital equipment costing more than 200,000 Swiss francs (about 184,000 Euro). Price represents a certain part of the bid. The other factors are technical features, such as the power of the tube, the presence of dual energy, and the number of slides, as well as post-sales service, taking into consideration the experience, reliability, and availability of technicians in Ticino. Siemens shines in this category, as it has four technicians on call 24/7/365 in the canton, one entirely dedicated to CT. "We almost never have to call them but it is reassuring to know that we can," says Filippo Del Grande, MD, Chief Radiologist at Ospedale Civile Regionale di Lugano in Ticino, Switzerland.