A modern imaging center at full operational efficiency

For more than thirty years of its existence, the independent center “Imagerie Paris Nord Sarcelles (IPNS)” situated in the north of Paris, France has been solely focused on the provision of high quality diagnostic and interventional radiology services. To do so the center has always had a policy of keeping its imaging systems and software up to the latest technological standards.

Currently the center offers all principal imaging modalities with up-to-date MRI, CT, ultrasound and interventional radiology systems, all being used with modern image viewing software, the iReview, as part of iNtuition from TeraRecon.

We wanted to find out more about the center in general and the equipment in particular so we spoke to Dr Robert Lavayssière, radiologist and CEO of the center.

Q Let’s start at the beginning. Please tell us about the IPNS center.

Our practice is independent but we work closely with the “Hôpital Privé Nord-Parisien (HP-NP)”, a 300 bed facility dedicated to surgery and obstetrics but also with a palliative care unit. There is also an outpatient centre for ambulatory surgery and specialist consultations along with an emergency centre (open 24/7) a dialysis centre and other specialty centres (pediatrics, women’s diseases). There is also a large oncology centre with 3 linear accelerators and 12 chemotherapy beds. We have been cooperating in full mutual confidence with all these units for many years now.

As for the patients we see in our center, many of them come from the local département, which has a population of 1.2 million, but our geographical hinterland is even bigger: we get patients from the north of Paris, the city itself, the surrounding suburbs and even from provinces further afield.

They are generally referred to us by GPs, but in addition we also get a significant proportion of referrals from hospital-based physicians, particularly in oncology which is one of our fields of expertise.

Q What does this mean in terms of examinations carried out?

We carry out a total of roughly 80 000 examinations per annum of which approximately 25 000 are straightforward X-ray procedures; 20 000 CT; 17 500 MRI, 6 to 7000 US.

Regarding interventional radiology, all our radiologists undertake Level 1 and Level 2 procedures, such as US or CT-guided biopsy, MSK procedures, breast biopsies, etc. In addition one of our radiologists carries out level 3 interventional procedures, e.g. biliary, esophagus/colon prostheses, fiduciary positioning prior to cyberknife radiotherapy, balloon protection for prostate radiation, etc. For these heavy, Level 3, IR procedures we have a dedicated OR with 3D imaging capabilities.

In addition to all this, there are also procedures carried out by the obstetricians who share our facilities. These include 7000 mammograms, 3000 breast US and about 1000 breast procedures such as micro and macro biopsy, pre-op targeting, US guided and Mammotest. We also have on-site access to gamma cameras and a PET-Center but organizationally these are independent of our center, as is usual in France where nuclear medicine is considered as separate specialty from radiology.

The total number of examinations carried out is more or less constant or at best growing only slowly, 1 to 2% per annum. This is mainly due to the imaging equipment currently running more or less at full capacity. When this is combined with the fact that we find it difficult to get the number of radiologists we need ideally, we are obliged to impose a voluntary limitation on the numbers of procedures carried out so as to keep up a satisfactory level of service, both from the medical and non-medical points of view. Inevitably this means growing waiting lists but this is our way of coping with the dramatically huge demand in our suburb, situated as it is 15 km to the north of Paris, in the outer ring of Paris.

Q And what about the kind of cases you see?

We get a wide range of cases and from the emergency departments and different specialties. We have three major specialties, namely oncology, neurology and MSK. It should also be pointed out that our suburb is economically underprivileged and has a large immigrant populations (there are no fewer than 70 different nationalities in Sarcelles!), so we see a lot of cases/diseases typical of the immigrant population.
Regarding the most frequently used imaging modalities, CT and MRI are clearly at the forefront, as you might expect. The demand for mammography is also increasing, to such an extent that to keep up we need more specialists in this field, which is difficult to achieve. We find that the younger generation particularly are not really keen on specializing in breast diseases (because of relatively low profitability and high stress).

After a 5 year period of decreased activity in X Rays we were forced to carry out a deep and thorough reorganization of the department including full digitization for ER and MSK applications. Now our US/X Rays department is quite busy.

Q Now let’s turn to how you keep up with this demand. What personnel and equipment do you have to provide the service expected of you?

We have 6 full-time staff radiologists, each working between 55 and 65 hours a week, and 4 part-time radiologists. We have a support staff of a total of 55 people, including secretaries, state board certified technicians and clerical/administrative staff and one senior administrator.

We are well equipped although all our systems are running flat out. Currently we run two CT systems (16 slice and 128 slice GE Optima 540 and 640), two 3Tesla MRI (Siemens Spectra), 4 US systems (various models from GE) for use in breast, general, gyn /obs, and interventional applications. Our fully digitized X-ray systems are from Agfa & Stephanix. For breast uses we have one FFDM and one Mammotest biopsy system, Finally for interventional OR work we have the Innova 4100 system from GE.

Q What about software packages e.g. PACS, RIS, and viewers that are vital for the efficient running of any imaging center?

When you think that I started informatics in my department as far back as 1984 (with main frame computers), you’ll realize that we’ve evolved a lot since then!

We made a partial move toward PACS around the early 80s but finally decided — basically for budget reasons — to go for dedicated workstations, linked to modalities, instead of PACS workstations. The approach we finally adopted relied upon mass memory systems becoming available and a very good RIS (provided by the French RIS specialist company EDL); these were vital to the real core of our strategy. The key point was our need to find a solution to be able to read any modality from any point; our providers at the time were unable to provide such a solution at a reasonable cost.

We did experiment with some partial solutions (Intrasense, Osirix) and then we looked at TeraRecon about 4 years ago.

TeraRecon was already known to us through RSNA and other technical exhibitions but initially appeared to us as somewhat “exotic”. However we met very fine people and soon came to an agreement with them more than 3 years ago. In this collaboration we were also supported by EDL who provided the inter-operability with the RIS. We had deliberately decided against building up an in-house informatics department; instead we rely on an external technical support partner, SG Prod, who were also involved in the collaborative effort.

Prior to this we used various viewers but none was able to let us read all in one, from X Rays to CT or MRI. We wanted a kind of “dashboard” to monitor incoming patients and those undergoing examinations but also to have after each procedure a broad view of work according to categories, not just categories such as emergency or waiting patients but also the availability on-site (and eventually off-site) of staff specialties. It is worth mentioning that each of our radiologists has a workstation at home — with the same function- alities as those on-site — for emergency reading and/or specialty advice. This has brought some relief in everyday quality of life without any compromise in terms of quality.

Q And, in short, why did you opt for TeraRecon?

There were several reasons behind the decision to go for the two systems from TeraRecon that we now have, namely the iNtuition iReview and the iNtuition 3D advanced visualization solution. Of course technical features such as specifications are important, but the human aspect is just as important, if not more so. By “human aspect” I mean in particular dealing with people who can not only be totally trusted but also have a deep knowledge of the product and a willingness to provide the best service at all times. We happened to know some of the personnel of TeraRecon from previous positions in the industry and so we knew that we could rely on them after the systems were installed. Last but not least, choosing such an independent partner has uncoupled us from the modality providers who are not only often limited by the need to offer a worldwide globalized product but also proceed at their own pace, usually slower and not in accordance with ours. We have been able to customize — partly through the RIS — the TeraRecon workflows to comply with our needs.

At IPNS, workflow efficiency is important. The iNtuition system integrates traditional 2D workflow with multi-modality review and advanced visualization.

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Q So how has it panned out? ?
Right from the beginning the new systems were adopted by all the radiologists (except for one radiologist, who still partially uses an old work station, a bit like someone reluctant to throw away a worn-out, but familiar and comfortable old pair of carpet slippers. Which just goes to show that resistance to change can still exist even in the face of the clear advantages of changing. )

The main reason for our satisfaction is that the TeraRecon viewers are interfaced with the RIS and display protocols are linked not only to the type of examination (X Rays, CT, MR, etc.) but also to the anatomical location. The workflow is secure and robust, saving time for interpretation and review in that prior procedures are pre-loaded and previous reports are on line. The iReview system offers the first level needed for most reviews; it is easy then to switch to iNuition 3D for more complex needs, although the iNuition 3D is used right away as first viewer for routine CT readings. Above all, the number of “clicks” is limited to one or two, which is the upper limit of any normal radiologist…

Regarding interaction with archives this is straightforward and simple: neither fuss nor mess! We have both online and long-term storage and Q/R runs smoothly.

Another feature that is really appreciated is the 3D reconstruction especially when comparing different series, as well as those of the current day and previous ones when used in combination with iNuition iReview. The automated processing server (iNuitionAPS server) offers pre-processing and 3D display protocol/display scenarios. This saves a lot of time, especially — but not only — in vascular imaging and is a huge advantage in real life...

The combination of the iNuition automation with the presentation states is really robust, is (nearly) bug-free, and easy-to-use and install: it is a reliable and easy-to-use working tool, not just a device for computer geeks.

Q No draw-backs ?
Well, if you push me..... the current TeraRecon workflows embed two different viewers which have different origins and conceptions (US/Japanese and German) which support the different workflow structures but some minor adaptations are needed when switching from one to the other. This can be irritating but on the other hand it’s a good way to keep the personnel on their toes and their brains awake!

We look forward to a release that will merge both interfaces into one, which we understand is due to be implemented soon.

Q what about image sharing?
That’s the next step. We already share some images with physicians but not on a systematic basis because of regulations and some complexity due to coding and confidentiality. We have tried three systems up to now but none gave full or easy service. Another point is that most physicians (especially those of older generations) are not used and/or trained to look at images, since their time per patient is quite limited. Previous image-sharing solutions such as CD and web-based, were too cumbersome and were quickly abandoned by most GPs and specialists. Let’s see what we can do with the iNuition iEMV due to be implemented soon.

Q How is all this software supported and kept up-to-date?
As mentioned earlier we don’t have any in-house informatics capability but rely on external partners. Support from TeraRecon has been very good, so far. They are very quick in their response time and interact well with our other support partners. We find this system works well.

Once again human relationships are important: our technical support partners combine their technical knowledge with an understanding of the medical objectives of our work, which is more than just image production.

On the other hand, requests for software changes take a bit too long for our liking but we are patient since we realize that our requests are either just minor adjustments or too fundamental a change, e.g. the different software organization of the two main tools (iReview and Aquarius iNuition). We understand that real changes are on their way, so we are eager to discover them!

Our service contract covers the evolution of clinical software — a topic that is critical since evolution means additional training. I believe that there is something to improve on this side as continuing upgrades to a full solution during a product life cycle also means time investments for radiologists, which they can ill afford. How software is upgraded is a becoming a strategic question — all the more so since we know that nearly all software users actually only exploit a small part of the overall possibilities of the software, be they medical or non-medical.

We have suggested to TeraRecon to put more focus on customized upgrades dedicated to specific needs rather than full version upgrade at every major step.

Q And, the end result of all this on radiologists’ workload and productivity? In the end, as you can understand from our case load, productivity is of utmost importance to us. We reached our objective which was to be able to cope with a tremendous amount of work, more images and more cases to read. All this was made even more challenging because of the ever-increasing number of difficult cases we have, such as those with neurological diseases or cancers, particularly ENT, chest, colo-rectal cancers or breast micro-calculifications in young women. Our referring oncologists need to monitor the effect of therapy in such cases. For us, this involves comparative evaluation and measurements (e.g. RECIST) and is important but time-consuming, so the TeraRecon systems are very useful to us in this respect. Of course the monitoring examinations, e.g. CT or MRI, needed to generate such data are in themselves quite stressful for the patients, but also for the physicians, too.

We calculated that we have saved at least 0.5 full time radiologist position — if not a whole position — thanks to our new workflow. Thus, we have managed to significantly improve our productivity without going crazy in the process. However, in accordance with our belief that medical imaging is not just a “churn-it-out” commodity but a real service for patients, we have recently decided to limit our case-loads, except for real emergencies.

Q And how do you see the future? We take one step at a time in a very unpredictable political and financial environment. Eventually some consolidation/merger may be envisaged but there is still a long way to go before this happens, especially in Paris or the greater Paris area. The use of common or inter-operable tools will then be mandatory. The next two major developments, will be out-of-facility image distribution and neutral archive storage.

However, despite our deeply rooted French spirit, we nevertheless prefer pragmatic evolution to revolution...