

# Organising and Running an Integrated Tertiary Rhinology Service: from the lab bench to the operating theatre

The variety of anatomical and mucosal pathologies coupled with innovative medical and surgical approaches render rhinology one of the most challenging and attractive subspecialties. During the last decade, significant progress has been made in the medical management of upper airway disease, culminating in the ARIA<sup>1</sup> and EP3OS 2007<sup>2</sup> evidence-based guidelines. Concurrently, the use of endoscopes has revolutionised not only sinus surgery but also the surgical approach to the anterior, middle and posterior skull base.

In spite (or because) of this (r)evolution in rhinology, patients with complex conditions have higher expectations and in many cases, their management is shifting away from general otolaryngologists towards highly specialised centres, where multidisciplinary teams work at the interface of rhinology, allergy, pulmonary medicine and neurosurgery.

We would like to present our experience from organising and running such a centre, without aiming to project it as the 'definitive' setting.

A standard way of defining quality in healthcare is the 'degree to which Health Services increase the likelihood of desired health outcomes and are consistent with current professional knowledge'.<sup>3</sup> As such, quality in healthcare encompasses six areas:

- Patient safety,
- Patient centredness,
- Effectiveness,
- Efficiency,
- Timeliness,
- Equity.

In our department we try to implement the above by focusing on the following:

## Training

Training is vital in sharing the centre's experience and expertise. At a national level, a subspecialty training program for senior registrars / residents can assist in disseminating the centre's experience nationally, while equally important is, in our opinion, the establishment of an international fellowship program. Specialists from different countries may benefit by getting some hands on experience or even just being exposed to tertiary rhinologic cases and complex endoscopic / skull base surgery (including Draf 3, hypophysectomies and middle and posterior skull base endoscopic surgery), while at the same time bring their own valuable input in the management of these patients. A 'virtual network' of people who trained in the centre can thus be created, with immense significance for the further development of

international projects and postgraduate education programs. A potential problem can be the conflicting requirements of local residents and international fellows: A steady flow of interesting clinical cases and the clear delineation of roles (coupled with a positive attitude from both parts) can help smoothen any potential conflicts. Although the very successful fellowship of the European Academy of Facial Plastic Surgery has been running for many years in our department, a similar one for rhinology, under the auspices of the European Rhinology Society is missing, and we hope to work towards its creation over the next few years. In the meanwhile, we are running three-month fellowships and two-week mini fellowships, with significant participation over the last two years from senior trainees and specialists from the UK (which is the country most represented, mostly by final year SpRs or post CCT's) but also countries as diverse as Australia, Germany, Italy, Greece, Belgium and Norway.<sup>4</sup>

## Providing access

This is the cornerstone and the 'raison d'être' of any department. It is vital that General Practitioners and general otolaryngologists are aware of and use appropriately the specialist rhinology services provided. Deciding on what kind of service the department focuses depends on the particular areas of national / international expertise, as evidenced by clinical and research experience, clinical care pathways and management algorithms. In our department this is frontal sinus pathology and surgery, pituitary and extended skull base applications of endoscopic surgery, management of patients with cystic fibrosis as well as recalcitrant upper and lower airway disease patients and complex rhinoplasty patients. We view rhinology as one and undivided subspecialty, with rhinoplasty constituting an integral part of it – indeed, the first author has a significant rhinoplasty practice. The creation of multidisciplinary clinics is central in this endeavour, as well as a convenient referral pathway with easy access and clear points of contact (telephone / fax / email), especially for international referral patients.

Taking into account the fact that many of these patients may have travelled a significant distance, we aim to minimise the number of attendances. If a CT scan is indicated, we strive to have this performed the same day, with the result available during the consultation. A system of fast and effective feedback to the referring doctors is vital – and we find that emails are particularly effective in that respect.



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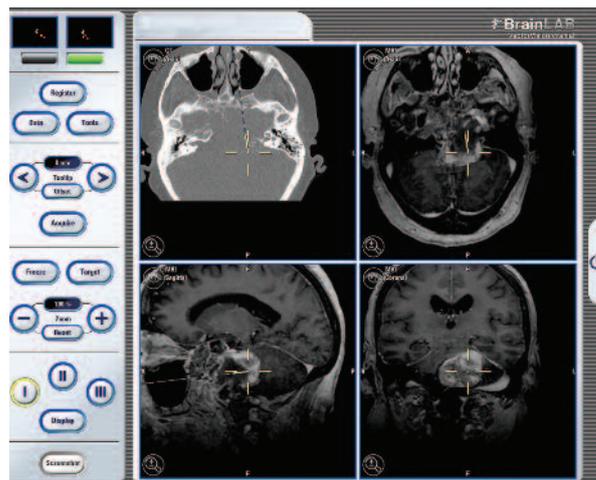
'How I Do It' is co-ordinated by

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Declaration of Competing Interests  
None declared.



The setting for endoscopic sinus / skull base surgery includes a recording screen, two High Definition screens and a Stealth® or Brain Lab® navigation system.



A case of a large clival chordoma compressing the brain stem and resulting in multiple cranial nerve palsies removed endoscopically.

### Research

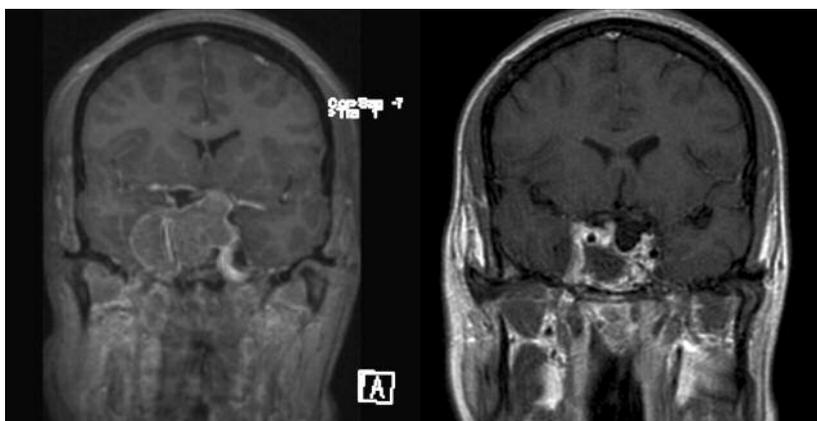
Research and clinical practice should co-exist in a mutually beneficial relationship: in a department with a wealth of clinical cases, basic science and clinical research projects can flourish, drawing upon the rich clinical material. On the other hand, clinical service can be significantly enhanced by research protocols as the distance between knowledge acquired at the laboratories and clinical practice is minimised. A number of protocols have been running in our department, some under the aegis of the Global Allergy and Asthma European Network (GA<sup>2</sup>LEN) and many multi-centre trials, a full discussion of which is beyond the scope of this article. However, a good example of putting into use the clinical setting in the benefit of research would be the osteitis project, which combines a clinical arm, based on a newly developed Facial Pain Score questionnaire for the assessment of facial pain in patients

with osteitis, a novel osteitis grading scale developed in our department and a basic science arm, whereas material from osteitic bone is routinely collected from patients undergoing sinus surgery and undergoing micro array in theatres. We feel that basic lab workers and clinicians working together can lead to breakthrough in knowledge. In our lab, the Pathology of upper airway group (Fokkens, Georgalas, van Drunen) has been investigating in three related newly initiated studies the potential contributing factors to the pathogenesis of NP: (a) the role of underlying bone structures, (b) the role of viral transformation and (c) the role of epithelium-fibroblast interactions. There is currently one post doc and 10 PhD students working in these projects as well as three full-time lab technicians. We firmly believe that research should be an integral part of the residents training – and aim to provide adequate time and support for that. Funding

however remains a challenge and requires creative use of University funds, national and international including European Union research funding and combined projects with the pharmaceutical industry.

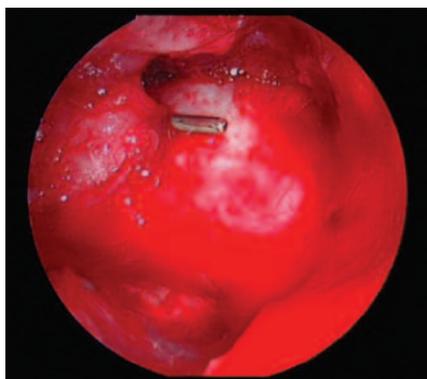
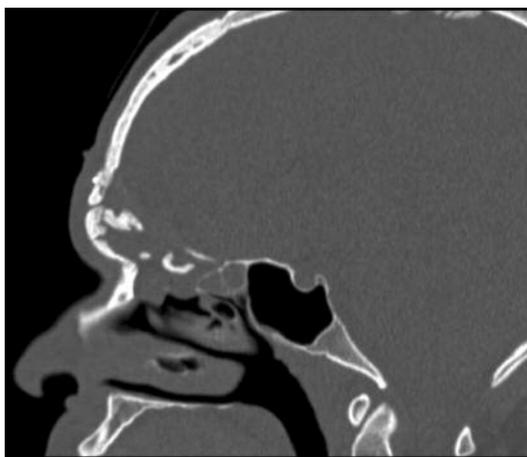
### Diagnosis

All CRS patients complete the SF-36 questionnaire assessing their generic quality of life and RSOM 31, which we feel provides the most comprehensive assessment of their nasal symptoms.<sup>5</sup> Tertiary referred, difficult to treat CRS patients often undergo a comprehensive evaluation for underlying immunodeficiencies, including IgA, total IgG and IgG subclasses, complement function (CH50 and AP50) as well as Manose Binding Lectin measurements. Tailored to their clinical picture, some of these patients undergo a work-up for systemic diseases associated with CRS including ESR, ANA, anti-DNA antibodies and ANCA (including anti-PR3 and anti-MPO, by IF and ELISA). The possibility of same day CT of the sinuses is available, if required. Sweat test as well as genetic testing for specific mutations for cystic fibrosis is performed, as well as electron microscopy of inferior turbinate brushings and biopsies for Cilia dysmotility syndromes, for children and teenagers with chronic sinonasal disease. Their functional status in terms of their olfaction is assessed with sniffin' sticks test and their nasal patency with Peak Nasal Inspiratory Flow (PNIF), acoustic rhinometry and rhinomanometry. In difficult-to-confirm cerebrospinal fluid leaks, we find the assessment of beta-trace protein ratio in merocel nasal packs left in situ and collected after 48 hours helpful in confirming the presence of CSF. Most of these tests including allergy testing are



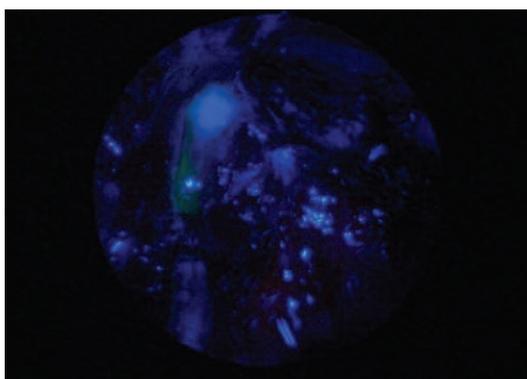
Left image: A patient with a large pituitary macroadenoma encasing the right carotid and associated with left hemianopsia.

Right image: The same patient two days postoperatively: Spongistan can be visualised in the empty sella – the tumour around the carotid has been removed.

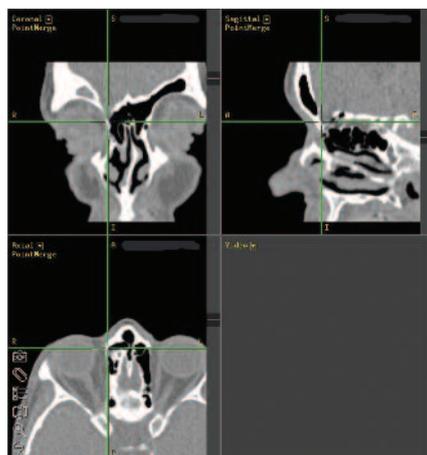


Top left image: A patient with a fronto-cutaneous fistula: we can see multiple fractures of the anterior wall of the frontal sinus, indistinct outline of the posterior frontal sinus wall, with multiple bony fragments in the frontal sinus, soft tissue and many fluid pickets within the frontal sinus and complete obstruction of the frontal sinus outflow tract. This was a result of previous trauma and neurosurgical reconstruction of the anterior skull base.

Top right image: The frontal sinus was drained endoscopically. A soft probe inserted externally through the fistula can be visualised endoscopically.



Bottom left image: Endoscopic view of the point of leak, visualised with blue filter and intrathecal fluoresceine.



Bottom right image: The location of CSF leak in a patient with anterior skull base fractures and frontal lobe prolapsed.

performed by specialist trained nurses, thus leaving doctors more time for clinical duties. We have found that the liberal use of telephone appointments results in less hassle and back and forth travel for patients and fewer overbooked clinics.

### Multidisciplinary clinics

A specialist allergy service is run with combined clinics with our 'in-house' department allergist, Dr Terrerhorst, while other multidisciplinary clinics include a – just started – weekly skull base / pituitary clinic that we share with two neurosurgeons, an endocrinologist and (potentially) one orbital surgeon. A fast and efficient referral system, that includes a dedicated email address (hypofyse@amc.nl) is now in place for such patients. Additionally, a bi-monthly upper and lower airway combined clinic (together with a chest physician, with special interest in cystic fibrosis patients) is being run. During this clinic we try to see as few CF patients in one clinic as possible and to spread them over time to prevent contamination with *Pseudomonas aeruginosa* by other CF patients.

### Management

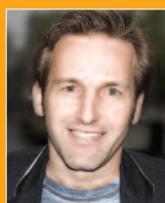
We feel the five hallmarks of patient care should be manifested in the overall patient management. Patient safety is our overall concern, with different levels of feedback at various parts of the system, including electronic risk management policy and monthly complication reports. We aim to maximise effectiveness and efficiency by taking part in writing and subsequently implementing care pathways and guidelines, such as for EP3OS and ARIA. Timeliness is guaranteed, by a waiting time not to exceed four weeks for tertiary referrals and two months for elective surgical management.

We feel that what we have learned is that success can only be based in partnership: working together with well informed patients, building bridges with other professionals, other disciplines within the hospital as well as with individuals and other departments internationally – a way of learning that is as much a way of sharing.

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