CASE STUDY

OTOPLAN – PLANNING EAR/COCHLEA SURGERY

Problem – Challenge
A quarter of the world’s population over 45 years suffers from substantial hearing loss. Such patients don’t understand whisper or softly speaking (<26dB). Besides that 2-6‰ of all babies are born deaf. An electrode, by which the cochlea is stimulated by electrical impulses, can be inserted to correct these severe hearing losses. However, this cochlea operation is a highly sensitive intervention with a multitude of parameters to be considered. The planning and execution of the surgery has an enormous influence on the result in terms of hearing quality.

Solution
OTOPLAN is a revolutionary tablet-based planning software for cochlea implantation surgery. The software quickly generates patient-specific 3D reconstruction from CT images, and easily visualizes each patient’s unique anatomy. This way it facilitates surgical planning, i.e. the surgeon sees exactly where they are going before they make the first cut.
It makes it easy to gain an ideal view of the cochlea and to choose the best electrode array for each patient to achieve the best hearing outcome. OTOPLAN works with patient specific data, shows insertion depths and covered frequency of each electrode contact. One-step processes exist to automatically generate case reports. Post-operative images can also be processed for quality check of the cochlea electrode insertion.

The software is based on years of work by the ENT Group of the ARTORG Department of the University of Bern and the Inselspital. The software has been licensed to CAScination AG, a spin-off company of the University of Bern, and brought to market together with MED-EL in Innsbruck.

CASE STUDY

ANTIA THERAPEUTICS – FROM A NEW POLYMER TO THE CLINICAL PRODUCT

Problem – Challenge
Embolization of bloods vessel is useful to control bleeding or to ablate diseased tissue by cutting off its blood supply. Endovascular embolization is used as an alternative to surgical interventions for a variety of purposes including for example the endovascular treatment of tumors or the treatment of lesions such as aneurysms.
To achieve endovascular embolization, a preformed polymer in suspension is usually injected into the blood vessel via a catheter and precipitates at the contact of blood forming a plug in the blood vessel. A radio-opaque material is often included in the polymer suspension to allow radiological imaging during the embolization process and clinical follow-up. However, the currently used radio-opaque material is not directly bound to the polymer and tends to diffuse out of the embolization plug over time which reduces the ability to visualize the plug and may further generate toxicity.

Solution
Antia Therapeutics has developed a novel radio-opaque polymer for minimally invasive embolization which contains a radio-opaque moiety covalently linked to the polymer, thus allowing for optimal long-term radiological follow-up. The polymer is moreover easier to prepare on site, just before injection, than currently used polymers. Antia Therapeutics was created in 2007 as a University of Geneva and EPFL spin-off, and has sponsored research at University of Geneva and Université Claude Bernard Lyon 1 to develop the polymer and optimize its formulation. Antia has then upscaled the production process and proceeded to the preclinical studies required to obtain CE marking in 2016. The polymer was successfully tested in humans in 2017 and has been validated for treating hypervascular malformations. Antia is now carrying out clinical studies for additional indications of its embolization product, such as for example in the neurointerventional field.