

## New high definition 3D Neurosurgery Endoscope

Safe neurosurgery is dependent on the surgeon's ability to visualise the fine and delicate structures of the brain. Historically surgeons were reliant on the naked eye and it was only with the development of operating microscopes that safe surgery became possible. The next step in this evolution was to use endoscopes, small cameras used for performing key hole surgery. The introduction of a High Definition (2D HD) endoscope system a decade ago at the Wessex Neurological Centre has made a big impact in some conditions and made it a centre of excellence for endoscopic surgery.

Historically endoscopes were used to treat disorders in the cavities in the centre of the brain (called ventricles). These are accessed by making a hole in the skull and piercing the brain. In the last decade a whole new field of endoscopy has been developed where the endoscope can be inserted through the nose and air sinuses to access the undersurface of the brain. This revolution has transformed the prospects for adults and children with tumours at the base of the brain. Southampton has led the development of this 'Endoscopic trans-nasal skull base surgery' in the UK. To date they have performed about 400 Endoscopic pituitary tumours and about 200 other tumours of the central skull base the results of which have been presented in various national meetings.

The technique is highly dependent on the clarity of vision the surgeon can achieve. There are a number of new advances in endoscope technology which patients at the Wessex Neurological centre would benefit from. The ultra clear definition of a 4K system will improve the surgeons ability to better appreciate the the normal and abnormal structures and will make these surgeries safer. The brain is of course also a highly complex 3D structure which to date has been only visualised in 2D through the endoscope. This in some ways is akin to operating with one eye closed. The advent of 3D endoscopes is therefore another exciting step forward to further enhance safety in endoscopic surgery. There are now also new fluorescent dyes that can be given to patients which highlight specific structures in the brain to make them easier to see. These however require new cameras in the endoscope to visualise them and are referred to as ICG imaging.

The Smile for Wessex Campaign to raise funds for a new endoscopic system capable of 2D HD, 4K, 3D, and ICG imaging will therefore put the Wessex Neurological Centre at the leading edge of neurosurgery and mean patients receive safer and less invasive surgery for previously difficult to treat tumours.