My visit to the University of Florida Proton Therapy Institute (UFPTI)

On 28 October 2012, just as hurricane Sandy was reaching Florida and heading northwards along the eastern seaboard, I escaped Florida and flew back to the UK after an extremely interesting fortnight at the UFPTI in Jacksonville. My visit was funded by a RCR-Cyclotron Trust visiting fellowships, which paid for my travel and a fortnight's accommodation in Third & Main, a comfortable self-catering apartment where my friendly neighbours were mostly patients at UFPTI.

I had previously attended the ESTRO proton therapy course and wanted to learn more about proton therapy. As a Clinical Oncology Consultant specializing in adult and paediatric neuro-oncology, I am a member of the neuro-oncology, skull base and paediatric MDTs, each of which discusses patients eligible for proton therapy. In May 2012, I also became a member of the Adult Clinical Reference Panel for the Proton Overseas Programme and therefore am one of several clinicians reviewing referrals overseas. The Christie (together with UCH, London) is preparing for a proton therapy service in around 5 years' time, and for my part, as I am part research funded, this will also mean developing research plans for CNS tumours.

After signing a confidentiality agreement, my hosts in Jacksonville most kindly allowed me to observe whatever I wished to see. Observing proton treatment planning, for a variety of tumours at different body sites, was a main focus of my visit and I also had the chance to attempt some planning myself (more practice definitely needed!). It was very interesting to note some differences to photon planning, e.g. the greater effect of tissue inhomogeneities, the need to allow for range uncertainties of the proton beam, and the fact that most of the Planning Target Volume (PTV) was usually covered by the 100% isodose, as opposed to the 95% isodose for photon plans. For prostate plans, it was usually possible to obtain good PTV coverage with a single beam (not feasible with photons), though two beams were used to average out the dose to the two femoral heads. Interestingly, this allowed prostates to be treated with a left and a right beam on alternate days (i.e. not treating all fields daily, as in the old days of photons, but now with acceptable dosimetry), and consequently treatment times could be reduced by treating all prostates from the left one day and the right the next day, minimizing time to move the large proton gantries. The skull base chordomas were probably the most challenging plans I saw, requiring end-to-side junctioning of fields ("through and patch fields"), resulting in large dose inhomogeneities at the junction lines, which would be mitigated somewhat by using multiple sets of through and patch fields junctioning at different lines, all away from critical structures. I also observed new patient assessments, on-treatment reviews and follow ups, attended tumour boards (MDTs), and various departmental meetings e.g. radiotherapy plan review meetings and case presentations. I observed patients being simulated and treated for a variety of tumours, and watched how slickly the paediatric anaesthetists worked with the treatment gantries.

While I was there the centre experienced a rare event of several consecutive days downtime (Friday afternoon to Wednesday afternoon) after a cooling pipe leaked 500 gallons of water and coolant into the vacuum chamber of the cyclotron - despite these pipes being replaced every six months as part of the maintenance programme. When the cyclotron goes down, all the treatment gantries go down! I was lucky at this time to be shown the cyclotron and beam line by the lead engineer. I was most impressed to see the centre's response, coordinated by the operations manager. Around 140 patients on treatment needed to be replanned for conventional photon therapy (3D conformal, or more often IMRT), which the planning room immediately got down to, in a strict priority order (e.g. children's tumours first). Planning and treatment staff stayed through the night when necessary to ensure that all patients received at least 4 radiotherapy fractions (photon or proton) that week. Other proton centres were put on standby to take patients if the downtime became prolonged, which fortunately wasn't needed. Patients were kept informed by their clinicians, and the medical director addressed all patients at the patients' lunch on Wednesday, where she dealt very honestly and effectively with questions and was finally thanked and applauded.

Overall, it was a very worthwhile visit, for which I thank the RCR, The Cyclotron Trust and my host at UFPTI. I am sure there is much more yet to learn, but this was a great start.