Covidien ACPGBI Travelling Fellowship Report
May-June 2019

Nick Battersby, Consultant Surgeon (Royal Cornwall Hospital)

Mr Nick Battersby is currently undertaking a post-CCT Colorectal Fellowship at Frimley Health NHS Foundation Trust and has been appointed as a Colorectal Consultant at The Royal Cornwall Hospital. He was awarded £2,500 for the Laparoscopic Colorectal Surgery Travelling Fellowship (Covidien Grant) by ACPGBI to visit two Danish centres of excellence in Nordsjællands Hospital, Hillerød (affiliated with University of Copenhagen) and Aarhus University Hospital, Skejby, Denmark (May - June 2019).

1st – 5th May – Hillerød
19th May – 7th June – Aarhus.

***Hillerød Hospital, Nordsjællands, Denmark (*1st – 5th May 2019)**

Background

The first week of my fellowship was spent under the supervision of Anders Bertelsen in Hillerød Hospital, 35km north of Copenhagen. I arrived in the beautiful city of Copenhagen early on a Sunday morning in May. There are amazingly well preserved colourful old buildings interspersed with fantastic modern architecture, including Henning Larsen's Royal Danish Opera House. I was most struck by the sense of calm. At that time in the morning, there was little to hear other than the noise of bikes being ridden through the city and lapping water from the Nyhavn river.

Anders kindly insisted on picking me up from the City. He was chatty and affable as we followed the coastal route to Hillerød. We passed various landmarks including the Hotel designed by the famous Danish Architect, Arne Jacobsen. He also pointed out the incredible Frederiksborg Castle (renovated 1860-84 with funding from The Carlsberg Foundation) and he demonstrated an encyclopaedic knowledge of British history in the process.

On the drive from Copenhagen Anders explained that the organization and delivery of surgical services in Denmark has undergone major changes since the 1990s (summarised in Figure 1). Colorectal cancer surgery in Denmark had inferior oncological outcomes to neighbouring countries, for example the 30-day mortality rate between 1985-2004 remained stubbornly high at 11% [1].

Denmark recognised this and published their first national colorectal cancer guidelines in 1998. These aimed to standardize management of colorectal cancer at all Danish hospitals [1]. The government published the first of its National Cancer Plans in 2000, which endorsed centralization of cancer services and nationally mandated data reporting of all cancer cases. With centralization and sub-specialization in place Anders and his consultant colleague, Anders Neuenschwander, have performed the majority of elective colon cancer resections in the Nordsjælland (North Zealand) region.

Anders was inspired by time spent with Werner Hohenberger in Erlangen in 2008. Since then Anders and Anders have routinely preformed Complete Mesocolic Excision (CME). They published their outcomes in a high-quality regional multicentre cohort study in 2015 [2]. Bertelsen et al. reported excellent long-term outcomes for CME (overall 4-year disease-free survival of 85·8%), with evidence for a survival advantage over non-CME surgery in this population [2]. A significant proportion of the CME resections were laparoscopic and this Danish group is one of several groups popularizing a laparoscopic approach to CME.

I completed my colorectal surgical training in the United Kingdom in 2019. I had already arranged an advanced laparoscopic fellowship (in Frimley Park Hospital) before taking up my post as a Consultant Surgeon at The Royal Cornwall Hospital. I was keen see how Anders and colleagues had incorporated laparoscopic CME surgery into their practice and whether there would be role for this approach at The Royal Cornwall Hospital.

Figure 1: Flow chart of diagnostics and treatment of colon cancer in Denmark, late 1990s–2014 [1]. Denmark formally focused on complete mesocolic excision (CME) from 2010.

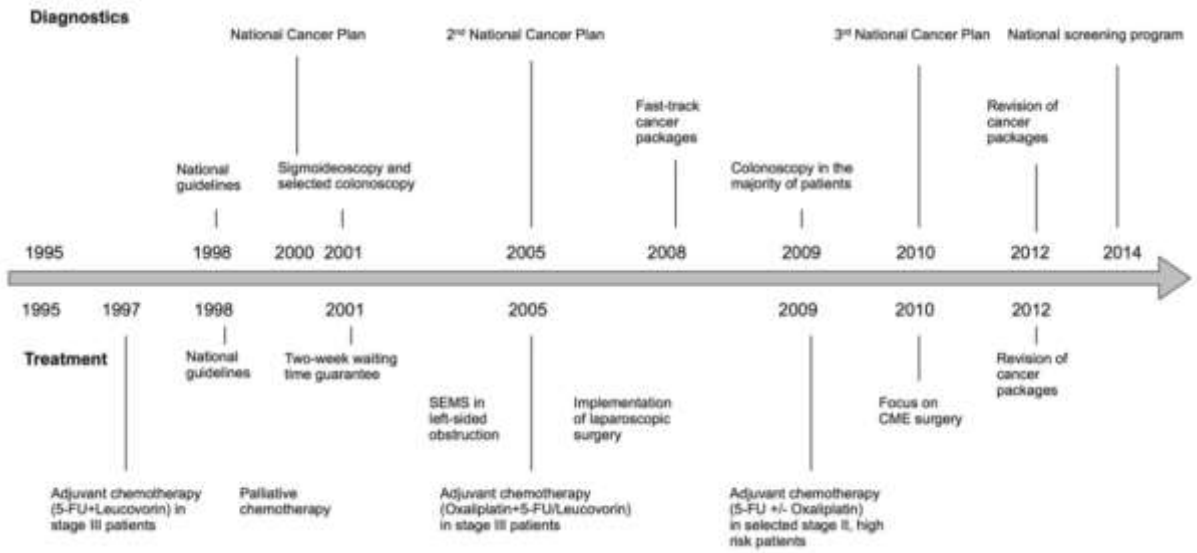


Photo 1: 'Anders & Anders'. Anders Neuenschwander (left) and Anders Bertelsen.

Photo 2: Front entrance of *Hillerød Hospital, Nordsjælland, Denmark*

Hillerød Hospital, Nordsjællands

Hillerød Hospital, in the town of Hillerød it is the main hospital in the Nordsjælland (North Zealand) which serves a population of 310,000. It is a part of Copenhagen University Hospital and part of the Capital Region of Denmark. This area has a population of 1.8 million, served by four units performing colonic cancer resections.

Unit Structure

The benefit of working in a European International Centre is that I saw similar pathology to that seen in the UK, being managed slightly differently in an equivalent healthcare system. Hillerød's unit structure is similar to the UK, in that there is a flat hierarchy between the consultant colleagues. The emergency and elective services are consultant driven with consultant led, relatively informal, daily

ward rounds. The consultants in Hillerød were Jens Jansen, Anders Neuenschwander, Anders Bertelsen (all Coloproctology) and Jens Bruun (Emergency) working closely with the specialist nurses, ward nurses and junior doctors. In addition, there were several residents going through their surgical training.

The unit undertook daily case reviews with a colorectal specialist radiologist prior to starting ward rounds. A departmental meeting to allocate and outline the forthcoming week's activity and theatre-plans was conducted every Monday morning.

The wards

The main colorectal ward is bright and patients shared two-bedded bays with large windows. There is a sense of formality but it is quiet and calm. Hillerød Hospital is 30KM from Hvidovre Hospital, where Henrik Kehlet developed and popularised the principles of enhance recovery after surgery (ERAS). As expected, the unit adheres to an ERAS approach, including thorough pre-operative counselling to prepare patients for a swift post-operative recovery. As Photo 3 and Photo 4 show the patients are encouraged to get out of bed and mobilise early, ideally the patients sit and eat together at the bottom of the ward, with lines and catheters removed as soon as possible.

Photo 3: The TOPRO Taurus is used to facilitate mobility on day one post-resection as part of the enhanced recovery programme. The wards are wide and light with bright artwork on the walls. A table and chairs are seen by the window at the bottom of the corridor. Where possible, the patients sit at the table together to eat their meals.

Photo 4: The morning ward round. This patient is day one post-laparoscopic high anterior resection (the catheter and IV lines have been removed).

Theatre

With the exceptional blip of trying to scrub whilst wearing my wedding ring (quickly rectified), the consultants and theatre staff were extremely welcoming. From day one I was free to move between theatres and assist in cases. Anders did a brilliant job of making sure there was a laparoscopic right hemicolectomy and laparoscopic high anterior resection listed amongst the cases during the week. Anders did not feel it was possible to stratify cases radiologically, therefore all colonic cancer resections in the unit were performed using a standardised complete mesocolic excision.

The setup for each laparoscopic CME case was very interesting to see. The conventional WHO checklist and team brief was performed. The experienced theatre team then setup and prepared the patient whilst the Surgeons were completing the ward rounds. Laparoscopic right and left hemicolectomies were performed in Lloyd-Davies position. The table (Trumpf Medical TruSystem 7000) was tested before each case. The Hug-U-Vac® was used to aid a steep Trendelenburg position if required. An inferior mesenteric vein (IMV) first, medial to lateral approach was used for the high anterior resection. This setup enabled the necessary extreme lateral tilt that was required (Photo 4- anonymised photo, taken with full consent). Anders & Anders operated very efficiently with meticulous dissection and seemingly optimal mesocolic plane preservation. During the case they reminded me that they have operated together for years; alternating as lead surgeon and defining their roles before each case. Interestingly, although they have standardised their port placement and all of the steps, they choose to use different energy devices.

The laparoscopic approach to the right hemicolectomy with complete mesocolic excision was fascinating to see. I had seen similar cases during live operating sessions at conferences and meetings but the opportunity to assist gave much greater insight. The setup is quite different from

the laparoscopic right hemicolectomy approach that I have become familiar with. The patient was in Lloyd-Davies position, with port placement in a more suprapubic position. The small bowel was positioned in the right upper quadrant to facilitate a sub-ileal and 'uncinate first approach'. As the assistant (rather than watching on a screen over coffee) the degree of exposure of the duodenum, uncinate process and SMV is striking. This was similar to some of the open dissections undertaken in Basingstoke but certainly more radical than laparoscopic dissections that I had been involved with. Anders pointed out that this is why he likes to do these cases with an experienced consultant colleague. The argument was convincing. Dual consultant operating not only allows for the shared decision-making but it also ensures complications can be pre-empted, or at least rapidly rectified should they occur.

Once the cases were completed, we reviewed the specimens before they were sent to histopathology (Photo 5). We then headed back to the surgical offices to complete the operation note. The lead surgeon then inputs the operative data into The Danish Colorectal Cancer Group (DCCG) database, which is obligatory following all colorectal cancer resections. The level of detail was surprising as the entry includes all the details that would be recorded in a routine operation note, along with details about the anastomosis, operative duration and intra-operative complications.

Heading Home

Anders drove me back to the airport after the case. With the Danish election pending we spent some of the 40-minute journey chatting about Brexit and Danish Politics. Anders also reflected on the day's operation. I sensed that he was disappointed with the case because it had been trickier than anticipated. However, I was delighted by my experience. This is the insight and understanding into unfamiliar techniques that can't be gleaned from edited videos and can only be achieved by visiting those units generous and professional enough to welcome other surgeons.

Photo 5: CME specimen from a right hemicolectomy

Courses

During the fellowship I was invited to attend the Robotic and Laparoscopic CME course chaired by Jim Khan in Portsmouth. Attending the course confirmed that the most robust evidence for CME surgery comes from Anders Bertelsen's work [2]. The live operating reflected much of what I had seen and it was reassuring to hear similar themes being discussed. There was a clear focus on safe standardised surgery and high-quality mentorship. The step-by-step critical view concept developed by Stefan Benz et al was also very helpful (https://youtu.be/1gojOAfH0Ic)[3].

Aarhus University Hospital, Skejby, Denmark (May - June 2019).

Having briefly returned to the UK for a few on-call shifts I headed back to Denmark. For the second part of the fellowship I spent 3 weeks in Aarhus, the second city of Denmark, located on the Eastern coast of the Jutland Peninsula. The population of Denmark is 5 million and Aarhus has over 300,000 inhabitants.

My hosts were Professors Peter Christensen and Søren Laurberg. I joined the unit within a few months of the department moving from their former home at Aarhus University Hospital, on the outskirts of the city centre to a newly built modern hospital in Skejby. Skejby Hospital or The New University Hospital, is a 'super hospital' that has merged several smaller hospitals from the central region of Denmark. There are over 10,000 staff, 1,150 patient beds, 44 departments, 2 helipads and 10 inpatient tower blocks (A-J). The colorectal unit is based in block C (Photo 6). It is a very impressive building, and due to its scale many consultants got from place to place using scooters that they had reclaimed from their children. The on-call staff used bikes to reach crash calls.

I chose to stay in a welcoming little airBNB that was in the village of Skejby, less than 1km from the hospital.

Photo 6: Standing outside the main entrance to the colorectal unit at Skejby Hospital, Aarhus, Denmark. Wearing the 'smurf suit' theatre scrubs.

Unit Structure

The colorectal unit work in sub-specialty teams. Niels Thomassen and Ken Lungman lead the minimally invasive team (laparoscopic/ robotic colorectal resections, transanal endoscopic operations [TOE] and advanced endoscopy). Henrik Christensen, Lene Iversen, Vik Verwaal and Mette Møller lead the advanced malignancy team (recurrent & locally advanced rectal cancer and peritoneal malignancy). Lilli Lundby and Peter Christensen led the pelvic floor unit.

ACPGBI awarded this fellowship with a grant from Covidien (now subsumed by Medtronic) to support further experience in laparoscopic colorectal surgery and so I spent most of my time with the minimally invasive team. I was also keen to experience many of the other things this colorectal unit has to offer, so I was able to spend time with the other specialists. The hospital is the national referral centre for cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) and advanced pelvic malignancies. It also provides the central regional service for rectal cancer and proctology. The consultants, trainees and theatre staff were extremely friendly and so it was a

pleasure to take part in cases with the locally advanced team, as well as with Lilli Lundby and Peter Christensen who enjoy a high volume proctology practice in the pelvic floor unit.

I attended several cancer MDTs during the fellowship. These began with cases eligible for minimally invasive surgery and tended to conclude with complex locally advanced or peritoneal malignancy cases. I was very grateful to Katrine Emmertsen (senior registrar at the time, now a consultant at Randers Hospital) for translating during the MDT and to Bodil Ginnerup Pedersen, their fantastic radiologist, for going through images after the MDT. Having emailed Bodil many times for MRI reports during my low rectal cancer research it was great to finally meet her. I did join ward rounds a few times and attended clinic (the consequences of treatment clinic) but the language barrier made this predictably difficult.

The colorectal unit has a busy, clinically orientated, research team led by Soren Laurberg, former president of ESCP, and Peter Christensen (ESCP Communications Committee Chair). They were fantastic hosts who were always kind and very entertaining. I had undertaken research with the Aarhus research unit previously but had not had an opportunity to visit them. We had several research meetings that focused on low anterior resection syndrome (LARS) while I was there. It was a pleasure to get the chance to collaborate with them again (Photo 7).

Photo 7: My hosts in the research unit: (Clockwise) Therese Juul, Katrine Emmertsen, Peter Christensen (front right), Soren Laurberg (front left), Mira Mekhael, Klaus Krogh. They're also the team that developed the Low Anterior Resection Syndrome (LARS) score.

Daily routine

Every Monday started at 7:30 with a meeting to plan the theatre schedule and discuss morbidities and mortalities. It involved all the surgical team, including 10 – 15 consultants, surgical residents, and the equivalent of foundation doctors as well as medical students. In addition there were daily meetings at 7:45am to plan the theatre schedules and emergency admissions. A daily radiology meeting to review the images of the planned theatre case and selected in-patients followed this. The operating schedule was busy with colorectal resection cases running in parallel on most days. I was surprised that surgery almost always finished by 4pm. The early finishes, coupled with several Danish spring national holidays allowed plenty of time for sightseeing in Aarhus, which was a real luxury (Photo 8 & Photo 9). We also had lots of chances to continue research, along with finding time for a few drinks in the evenings (Thank you Soren, Katrine, Peter and Coloplast).

Photo 8: Touring Aarhus on Prof. Laurberg's bike.
Top) The Infinite Bridge by Gjøde & Povlsgaard Architects, with Aarhus City across the bay in the distance.
Bottom left) The City square at night, middle) The Cathedral, right) cycling through the forest on the way to the Moesgaard Museum.

Photo 9: Evening barbeque for the colorectal fellows and researchers at Soren Laurberg's house

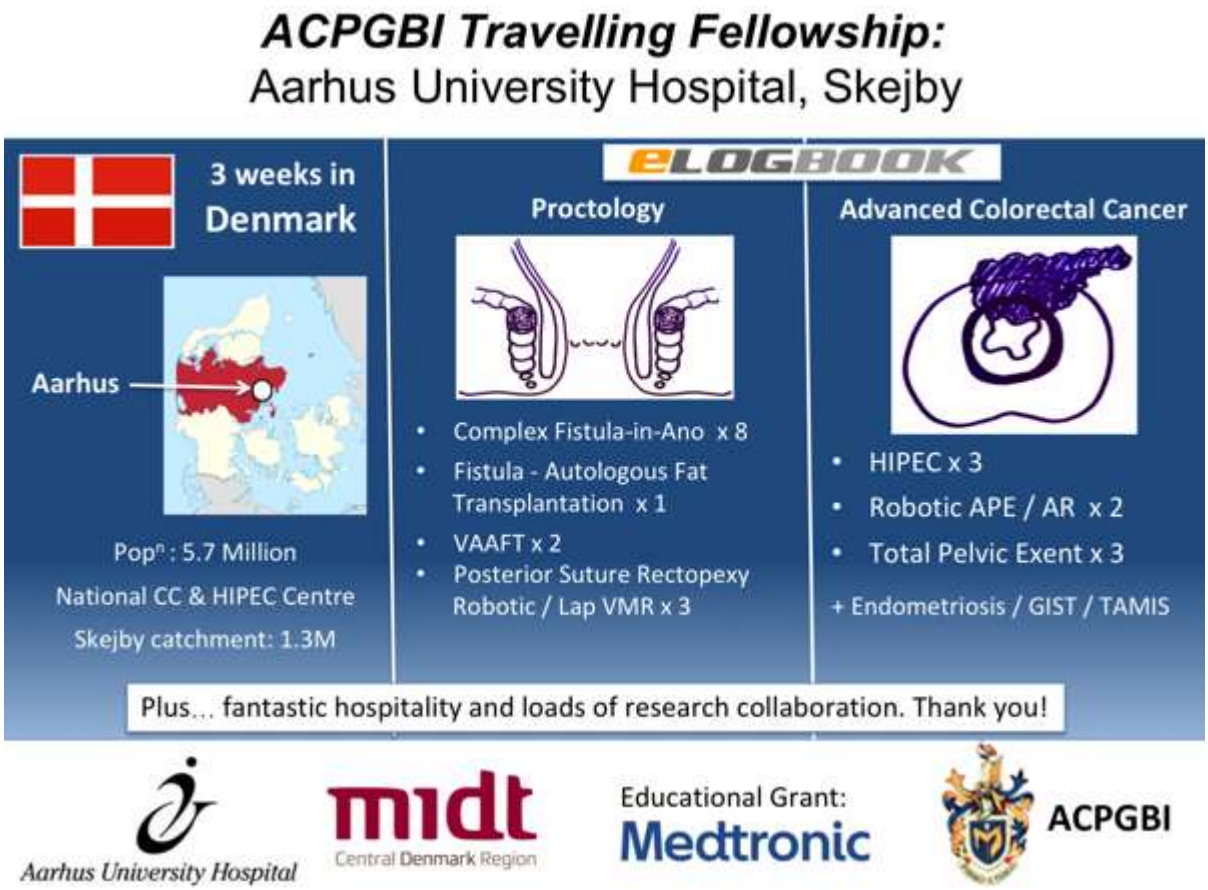
Operative Experience

Peter Christensen introduced me to the theatre team on day one and he was clear that I would be spending a lot of time there over the next 3 weeks. As in Hillerød, the theatre team were very welcoming. They taught me a few Danish words like 'Tak' and 'Saks' and I was amazed to be scrubbed and assisting within about an hour of arriving at the hospital.

The visual abstract below summarises my operative logbook during the 3-week in Skejby (Figure 2). I was able to participate in 27 procedures including treatment of advanced or recurrent rectal cancers, peritoneal malignancy cytoreductive surgery (with HIPEC – Hyperthermic Intraperitoneal Chemotherapy), laparoscopic endometriosis management with a combined colorectal/gynaecology approach, rectopexy and complex proctology.

Figure 2: Twitter slide summarising the operative experience during the weeks in Skejby.

(AR – Anterior Resection, APER – abdominoperineal excision of rectum, GIST – gastrointestinal stromal tumour, HIPEC – Hyperthermic Intraperitoneal Chemotherapy, TAMIS – Transanal minimally invasive surgery, VAAFT – Video-Assisted Anal Fistula Treatment, VMR – Ventral Mesh Rectopexy).



Operating with the minimally invasive team, I assisted with laparoscopic anterior resections. Much of the minimally invasive surgery was performed with the Da Vinci Xi robotic system. Niels Thomassen is a Da Vinci Xi mentor, and the unit was a major recruiter to ROLARR trial [4]. Having seen a limited amount of robotic colorectal surgery in the UK, and in preparation for my fellowship at Frimley Park (the lead UK recruiter to ROLARR), it was great to see the port placement and docking as well as the ease and familiarity of Niels Thomassen's rectal cancer TME dissections (Photo 10). On one occasion we converted to open and I was interested to find that the 'Open and Exenterative team' were called to complete the procedure.

Photo 10: Niels Thomassen docking the Da Vinci Xi for a low anterior resection

The Pelvic Floor and Proctology Experience: It was interesting to discuss full thickness prolapse management with Peter Christensen, especially as the controversy surrounding mesh has also concerned Danish surgeons. The group performed the only randomised trial comparing laparoscopic posterior sutured rectopexy against laparoscopic ventral mesh rectopexy (VMR). The study reported equivalent outcomes for obstructive defaecation syndrome (ODS) at one year [5], however long-term follow-up is favouring VMR [6]. VMR continues to be performed in selected cases, either

laparoscopically by the pelvic floor team or robotically in conjunction with the minimally invasive team (Photo 11).

I also benefited from the experience of joining the pelvic floor team for day case proctology. Complex proctology, particularly fistulating perineal Crohn's disease, is referred from much of Denmark. This case volume and the complexity of some of the cases has enabled the team to setup twice weekly lists, running three theatres in parallel. Two consultants (Peter and Lilli) along with their senior registrars, (Helene Hougaard and Jacob Duelund-Jakobsen) routinely discuss treatment options. They employ a variety of techniques from video-assisted anal fistulae treatment (VAAFT) to selectively using advancement flaps. Lilli Lundby explained that 'out of desperation' they have also started to inject freshly collected autologous adipose tissue for treatment of perianal fistula [7]. I was intrigued to see this highly novel approach first-hand, it is being tested in a RCT (clinicaltrials.gov NCT03803917) and the preliminary results appear to be very encouraging.

Photo 11: Peter Christensen fashioning the mesh for a robotic ventral mesh rectopexy.

Summary

This fellowship has been both enjoyable and productive, and I owe a great deal to the generosity of my Danish hosts, and to my sponsors. Anders in Hillerod and Peter in Aarhus were very hospitable and ensured I was welcomed into their departments from the start. Operating with experts in high volume units meant that in a short-time I gained great exposure to many operations and an insight into the decision-making behind them. I have been able to employ some of these techniques during the fellowship in Frimley Park and I will reflect on their rationale for operative decisions as I start as a consultant. Besides the excellent surgical training it was a pleasure to rekindle many friendships made through clinical research. As well as meeting other students and fellows with whom I enjoyed many meals in restaurants and in homes. Furthermore I had chance to explore this fantastic country.

Above all, I was inspired by the desire of Danish surgeons to deliver quality patient care through innovation, rigorous data collection, clinical research and honest interpretation of results; these are the principles I aim to maintain throughout my consultant career.

Acknowledgements

I would like to thank The ACPGBI and Covidien for providing the funding for this Laparoscopic Colorectal Surgery Travelling Fellowship. This has enabled be to develop links for future international collaboration and clinical insight that is likely to give rise to improved care for patients in the United Kingdom. I am also grateful to The Wessex Deanery and The Colorectal Department at University Hospital Southampton for allowing me time out of training to undertake the fellowships during the final months of my ST8 year.

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