Mr Euan J Dickson

James IV Association of Surgeons Traveller 2019

British Isles & Rest of the World Group

North American Travels	28 May to 15 June 2019
European Travels	4 August to 16 August 2019

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"Very occasionally in the course of a career there is a moment of genuine excitement which reinvigorates the pursuit of excellence and the strengthening of surgical friendships. The award of a James IV Travelling Fellowship is one such moment.

It is a tremendous honour and privilege and I am very grateful to the James IV Association for this superb opportunity. I hope to be able to divide my time between the United States and Europe with a particular emphasis on borderline resectable pancreatic cancer.

In addition to gaining experience in the technical challenges and complex decision-making, which define this disease, I aim to establish collaborative ventures with other centres. I look forward to sharing surgical knowledge, consolidating existing bonds and making new friends during my travels."

My thoughts regarding the award of a James IV Association of Surgeons Travelling Fellowship are perhaps best articulated in the short text above, which I was invited to compose for the James IV Association Newsletter.

I am forever indebted to the Association for this unique and invaluable experience. Despite my initial excitement and enthusiasm, the Fellowship exceeded all my expectations.

This report is subdivided according to the institutions I visited with later sections on my collective reflections.

Thank you

My sincere thanks to the James IV Association of Surgeons for this once in a lifetime opportunity, and in particular to Professor Michael Griffin who nominated and supported me. Special thanks to Jillian Hart for her unfailing guidance and patience. The hospitality and warmth in each unit was genuinely humbling and I think this speaks to the reputation and ethos of the James IV Association. In the spirit of the aims of the Association and of my trip, I gained fantastic insights in to the multi modality management of locally advanced pancreatic cancer including complex and radical surgical options. I gave a lecture in every unit and, perhaps more importantly, made new friends and renewed old bonds. I hope I have lived up to my responsibility as an ambassador for the Association.

I would be remiss not to thank the following, without whom this Travelling Fellowship would not have been possible:

- my hosts and all members of staff at the institutions I visited, who graciously gifted me the most precious commodities - their time and wisdom - with warmth and humility

- the patients who humbled me with their willingness to allow me to be involved in their care at an exceptionally difficult time in their life

- Mr Ross Carter and my clinical colleagues for taking care of my practice

- Professor Colin J McKay and the management team at Glasgow Royal Infirmary for accommodating my lengthy absence

- my Mum and Dad for a lifetime of selfless and unwavering support and belief

- Sarah's parents who stepped in to enable my travels and, in particular, the writing process!

- my partner, Sarah, and my children Ben, Anna, Lucy and baby Emily (who fortunately delayed her arrival until I returned from my travels) for letting me escape…

Theme and focus of my travels

The prognosis for patients with pancreatic ductal adenocarcinoma (PDAC) remains poor. There is increasing evidence, however, that multimodality therapy, including chemotherapy, radiotherapy and surgical resection, confers the greatest benefit. The role of total neoadjuvant therapy (TNT) is evolving and offers both renewed hope and additional challenges. It is likely that personalised medicine will also contribute to enhanced outcomes, with individualised treatment regimens designed for each patient.

The clinical theme of my travels is “Advanced Surgical Techniques for Pancreatic Cancer in the Neoadjuvant Era”.

Surgery in this context poses two significant challenges:

1. resection is technically demanding after chemo radiotherapy
2. many patients have vascular involvement which, whilst previously a relative contra-indication to surgery, is now justified in a select cohort

My aims were to gain insight and greater understanding in four key areas:

1. patient selection
2. decision-making
3. surgical techniques including vascular resection and reconstruction
4. peri-operative care including morbidity-management strategies

My focus is to develop these concepts and techniques in the West of Scotland Pancreatic Unit and to disseminate them to those caring for patients with pancreatic cancer.

Travel Summary

I divided my travels into a North American leg and a European leg, selecting seven high volume pancreatic centres of excellence. The total travel time was five weeks. I also attended the World Congress of Surgery during the European leg to deliver an invited lecture and participate in two international workshops.

My itinerary is summarised in the map below:

1. Mayo Clinic, Rochester, Minnesota
2. Johns Hopkins Hospital, Baltimore, Maryland
3. Perelman Center for Advanced Medicine, Philadelphia, Pennsylvania
4. Massachusetts General Hospital, Boston, Massachusetts

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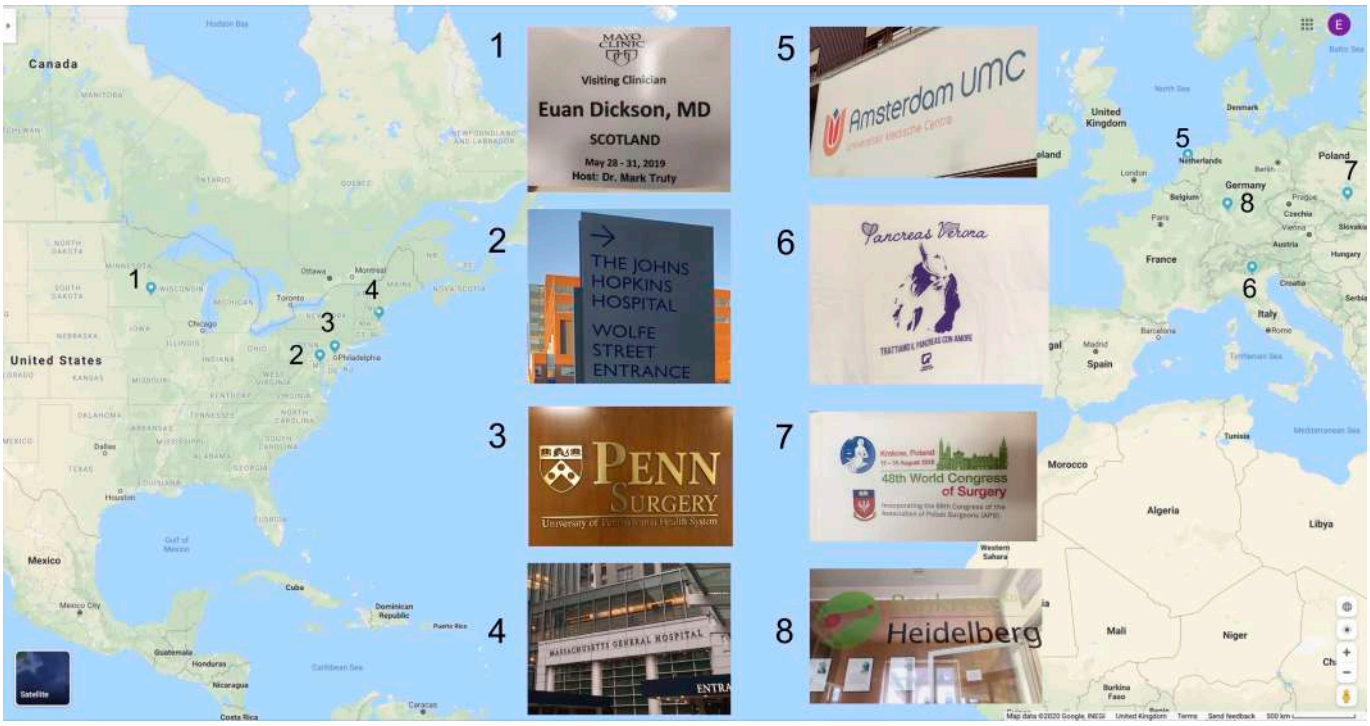
5. Amsterdam Medical Centre, Amsterdam, Netherlands
6. Policlinico Giovanni Battista Rossi, Verona, Italy
7. World Congress of Surgery, Kraków, Poland
8. European Pancreas Center, Heidelberg, Germany



Mayo Clinic

Rochester, Minnesota

29 - 31 May 2019

I departed Glasgow on Tuesday 28th May 2019 and arrived late at night in to Rochester, three flights and 23 hours later. Naturally, my suitcase with almost everything I required for the following day, was still in Heathrow, London.

Rochester is a "destination medical centre" - the entire infrastructure of the city appears to revolve around delivering world-class health care across a massive 17-institution complex. In the year I travelled, U.S. News & World Report had again recognised the Mayo Clinic as the No. 1 hospital in the country overall and ranked it top in twelve specialties, including gastrointestinal surgery.

Whilst the resident population of Rochester is 110,000, a further 3.3 million visitors arrive each year, many of whom travel for medical care. The scale of this operation is even more remarkable when one considers the relatively humble beginnings of the Mayo Clinic. On 21st August 1883 a tornado struck Rochester killing at least 37 people and injuring more than 200. Dr William Worrall Mayo with his two physician sons, Will and Charlie, helped to treat the injured. They were aided by Mother Alfred Moes and the Sisters of Saint Francis who later asked Dr Mayo Sr to help establish a new hospital for Rochester. Saint Mary's Hospital was opened on 30th September 1889 and this is where much of the complex pancreatic surgery is now performed today.

On my first morning I took one of the innumerable shuttle buses from my accommodation to the Gonda Building, which forms part of the main outpatient hub for the Mayo Clinic. These buses were often full of patients and their loved ones in search of hope, frequently as

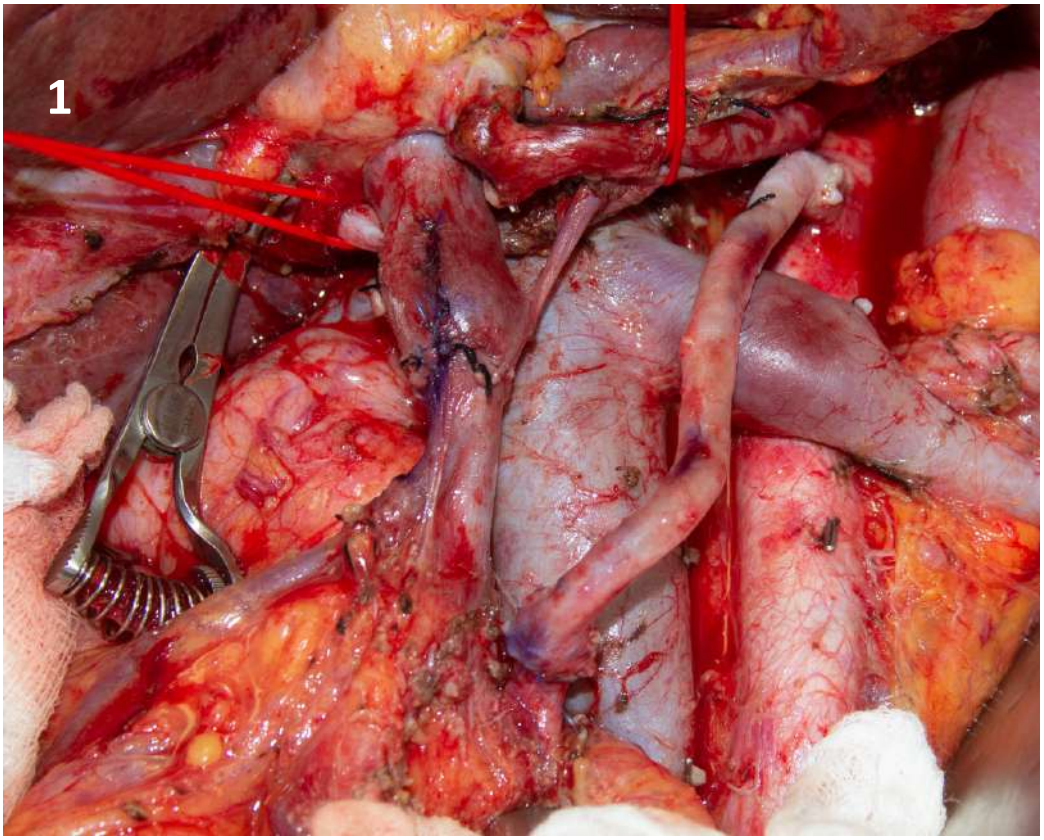
tertiary or quaternary referrals from other institutions. The Gonda Building is vast - 20 floors, with a further 10 planned - and has the feel of a super slick, extremely efficient five-star hotel. An endless stream of shuttle buses, cabs and private cars passed through the drop off and collection lanes in front of the hospital.

As I walked in through the marble lobby I had the recent Tweet from Professor Steve Wigmore, Honorary Secretary of the James IV Association, very firmly in my mind. Little did he know my suitcase was still in Heathrow and I arrived rather self-consciously for my first day wearing my casual, two-day old, travel clothes.

After processing the necessary paperwork I took another shuttle bus to St Mary's Hospital to meet my host, Dr Mark Truty. We had a fascinating discussion about his extraordinary pancreatic cancer practice in the neoadjuvant setting, which includes venous and arterial resection. His encyclopaedic knowledge and deep understanding of abdominal vascular anatomy, and the implications of "altering" and reconstructing it are incredible.

With the aid of operative photographs (below) and his recent publications he described his current approach which I believe may be best described as "thoughtful and appropriate surgical aggression", recognising that radical surgery may be but a part of a global pancreatic cancer management strategy. The morbidity and mortality of these procedures remains high, but both are continuing to decrease to acceptable levels as he gains greater understanding of the management of a new spectrum of complications in the neoadjuvant era. These technically demanding resections are only performed in those patients who have demonstrated a tumour response to pre operative chemo and /or radiotherapy.

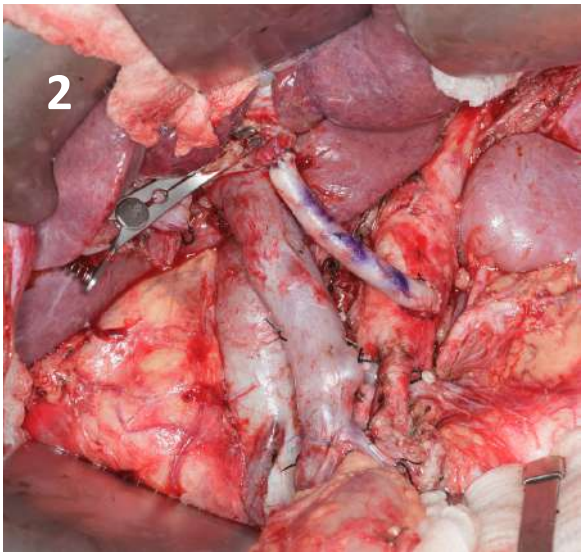
Staging of disease is also, therefore, in evolution. We know from our own neoadjuvant practice in Glasgow that contrast CT no longer reliably differentiates viable tumour from post treatment fibrosis. Enhanced “metabolic” staging is therefore required and the Mayo approach is to assess this with PET MRI and serum Ca19-9 as adjuncts to conventional staging. The prolonged neoadjuvant therapy also functions as a “biological selection” tool, offering surgery only to those patients who have withstood the “test of time”.

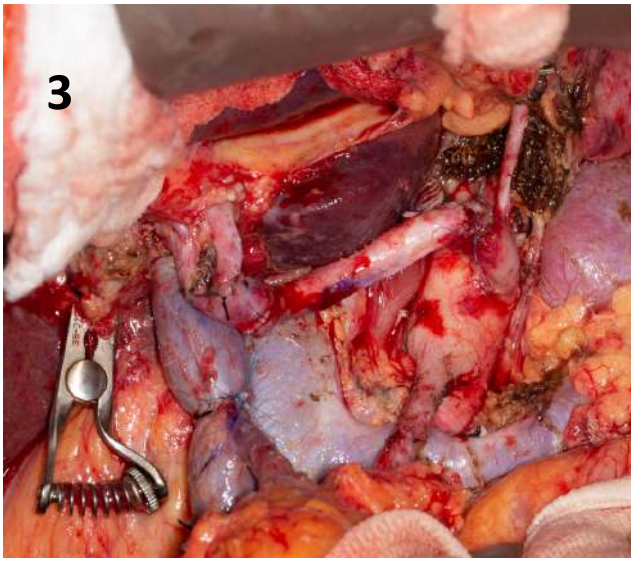


1.
SMV / SMA resection

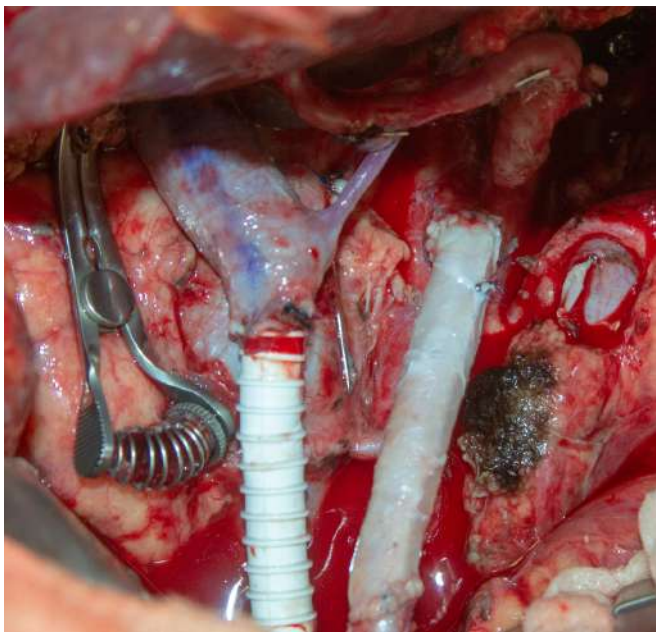
2.
Hepatic artery resection

3.
Portal vein / hepatic artery resection





We moved to Operating Room 102 where I observed a total pancreatectomy with arterial and venous resection. The patient was 58 years old and had completed 15 cycles of FOLFIRINOX for a pancreatic head adenocarcinoma followed by radiotherapy with good effect. The duration of pre-operative chemotherapy is significantly longer than we would employ in Glasgow and Mark's approach is to continue to deliver chemotherapy until the tumour stops responding. Despite a good treatment response, the superior mesenteric vein and artery still appeared to be involved on pre operative imaging and the surgical plan was to resect and reconstruct both of these vessels. Total pancreatectomy is employed for all arterial resections in an effort to mitigate the risk of catastrophic graft failure in the context of a pancreatic fistula and associated sepsis.



The operation took 12 hours and was a masterclass in vascular exposure and control. I dutifully recorded what I considered the 54 (!) most salient steps in the procedure. After resecting the superior mesenteric artery (SMA) en bloc with the specimen, it was reconstructed by harvesting the superficial femoral artery (SFA) from the left groin. The left SFA in turn was reconstructed with a GORE-TEX® vascular graft to avoid using synthetic arterial conduits in the primary surgical field. The spleno-portal confluence was also resected en bloc and an attempt made to restore venous continuity with a left renal vein interposition graft. This graft proved to be of poor quality and ultimately tore whilst suturing. A PTFE interposition graft was then used to restore SMV / portal venous flow with good effect. I found this aspect of the case fascinating as it mirrored my own experience of the challenges associated with venous reconstruction in the neoadjuvant setting. The impact of chemoradiotherapy on vascular structures within the surgical field cannot be underestimated and often results in friable, inelastic vessels, which handle poorly. Had I boarded a flight home to Glasgow at this point the trip would have been worth it for this day alone.

The following morning I met Dr Truty for rounds and I was able to appreciate the true extent of his pancreatic vascular resection practice. Surgery at this level revolves around risk mitigation and post operative morbidity management. As in our own practice in Glasgow, this requires a multi disciplinary team approach with interventional radiology and critical care colleagues playing a key role in rescue strategies. In addition to vascular resection, Mayo offers surgery to selected patients with lung, liver and even peritoneal metastases.

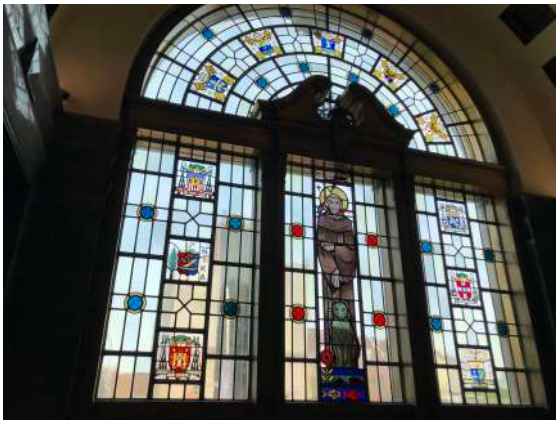
I was fortunate to also meet with Dr Mike Kendrick and discuss the role of minimally invasive approaches to pancreatic resection. He gave graciously of his time despite being in significant pain following a back injury. Dr Kendrick has performed more laparoscopic Whipple resections than any other surgeon and has taken this approach to another level. He routinely performs pancreatectomy with venous and arterial resections and we watched some impressive intra operative videos of his laparoscopic techniques. His views on robotic versus laparoscopic Whipple resections were particularly insightful. He believes it is easier to train and transfer skills from open surgery to the robotic approach but the lack of haptic feedback can pose tissue handling challenges for those without laparoscopic pancreatic experience. The major benefits of the minimally invasive approach include reduced post operative pain, shorter hospital stays and a reduced inflammatory response, though data confirming the benefit of the latter are currently limited.

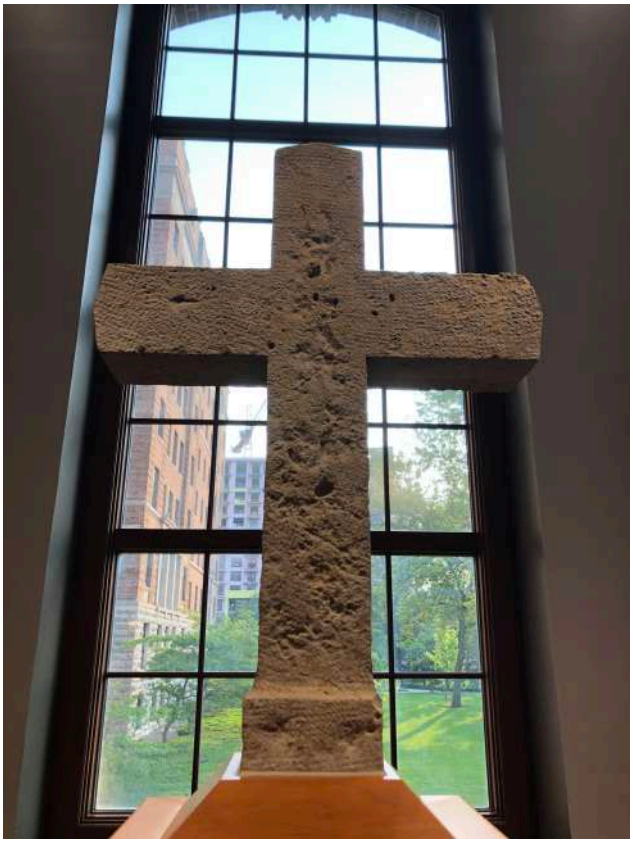
I joined Dr Mark Truty again for afternoon outpatient clinic and was impressed by the philosophy he described to his patients with pancreatic cancer: *"your goal is to survive with quality".* It was evident that despite his very aggressive resection practice he viewed chemoradiotherapy as the mainstay of treatment, with radical surgery reserved for those most likely to benefit. We had the opportunity in clinic to discuss pancreatectomy with coeliac axis resection. Mark described his pre operative assessment and vascular planning

with the emphasis on ensuring that two arteries remained to supply the stomach. If he couldn't achieve this, gastrectomy was performed to avoid the risk of gastric ischaemia with its associated mortality.

On my third and final day at Mayo I observed another neoadjuvant Whipple resection without vascular involvement. In addition to gaining a great deal technically from watching another surgeon performing cases similar to those in my practice, I was astonished to learn that full resection margin status was immediately available. A small army of pathologists and technicians waited to process the specimen in a laboratory across the corridor from the OR. This real-time feedback on surgical margins reassured the surgeon (and patient) that, in as much as one can ever tell, the tumour had been removed. On this occasion there was an excellent tumour response with a 1.5mm focus of residual tumour, consistent with the pre operative MRI PET images.

Later that evening I enjoyed a beer in the sunshine on the sidewalk opposite Saint Mary's Hospital (below) and reflected on a superb start to my travels.





Johns Hopkins Hospital

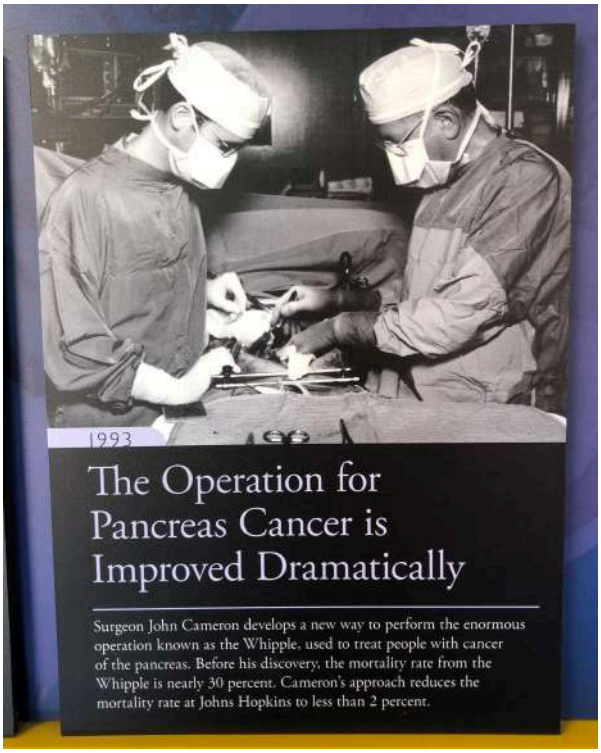
Baltimore, Maryland

3 - 7 June 2019

In an effort to maximise my clinical exposure in the company of other surgeons, I restricted my travel time to weekends and evenings where possible. With this in mind I took a flight the following morning from Minneapolis–Saint Paul International Airport, Minnesota to Baltimore/Washington International Thurgood Marshall Airport, Maryland for my visit to the Johns Hopkins Hospital. Heavy storms were forecast that day with tornadoes crossing the Midwest plains. Perhaps it was triggered by my expression, but I was thoroughly impressed at the immediate offer of a gin and tonic for breakfast upon boarding. Perfect for the petrified flier.

I made the most of the weekend getting to know Downtown Baltimore and the historic Inner Harbor, only straying once (and very briefly) in to “the ‘hood”. The Harbor area is stunning, even more so in glorious sunshine, and earns its title as “the crown jewel of Baltimore”. The waterfront has been transformed in recent years and has undergone significant redevelopment to become a worldwide tourist destination.

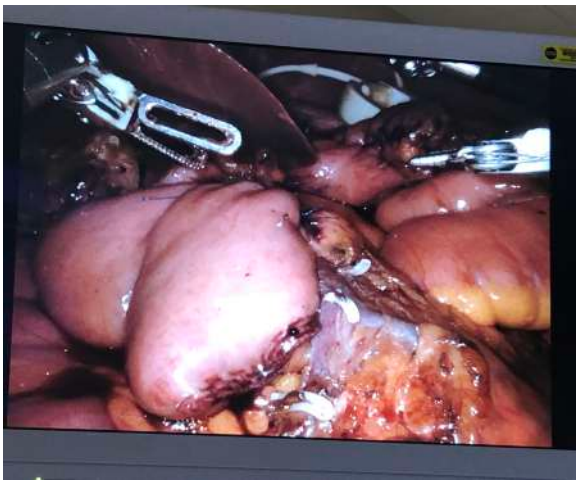
My weeklong visit to the Johns Hopkins Hospital (JHH) started on Monday 3 June 2019. The hospital, a few blocks walk from my accommodation, is rightly considered one of the leading hospitals in the world and a founding institution of modern American medicine. It is steeped in a rich surgical history, which is celebrated in numerous portraits, photographs and plaques adorning the hallowed walls. I visited JHH on a previous Fellowship in February 2009 when the legendary Dr John Cameron was the Director of Hepatobiliary and Pancreatic Surgery. This leadership role has now passed to Dr Chris Wolfgang who was attending surgeon in the unit when I last visited.



In the spirit of rekindling old surgical friendships I was keen to return to JHH where I met with Dr Wolfgang in his office. We had a great discussion on the evolution of the JHH pancreas cancer clinical and research programmes which continue to go from strength to strength under his leadership. When I visited in 2009, the JHH surgeons were performing 250 Whipple resections per year. This has now increased to 380 and these are largely performed by Chris and three colleagues (Jin He, Richard Burkhart and Will Burns who were also fantastic hosts).

A recurring theme of my travels was very high surgical volume and the significant impact this has on unit performance and therefore patient outcome. Neoadjuvant therapy for

pancreatic cancer has become standard of care and metastatic disease in carefully selected patients is no longer considered an absolute contraindication to surgery. Whilst these are predominantly patients with low volume lung metastases, the JHH is also conducting a trial involving patients with oligometastatic liver lesions. Those with three or fewer resectable liver metastases are offered resection of both the primary and the secondary disease after neoadjuvant therapy. This is a significant departure from our own and many other's practice and without Chris and his team pushing hard against the pancreatic cancer envelope it is unlikely that our knowledge, understanding and treatment of this disease will improve.



Another major development is their minimally invasive approach to pancreatic cancer. The Johns Hopkins Hospital has 9 robots (above with pancreatico jejunostomy) and Dr Jin He leads this aspect of the pancreatic surgery programme. Over the course of my visit I was privileged to watch Dr He perform several robotic Whipple and distal pancreatic resections. Having not been exposed to this previously I found it fascinating and he was very patient in describing his approach and technique. As an observer there was the additional benefit of being able to see the entire case from the operating surgeon's perspective, something that was not always possible with the open cases I viewed.

The following day was divided between observing a robotic distal pancreatectomy and attending the Pancreas Tumour Board Meeting. The latter was very informative and it was interesting to note the differences (and similarities) in practice amongst the various institutions and my practice. In contrast to our Pancreatic MDM in Glasgow, and I suspect most throughout the UK, this meeting was organised and chaired by the oncology service

rather than the surgeons who largely provided input with regards to technical resectability. Much of my own practice involves discussing patients who will never be surgical candidates, for example those with widely metastatic disease or those with significant surgical comorbidity. Whilst there are inevitably pros and cons to each approach the JHH system allowed the surgical team to focus on the patients most likely to benefit from their skillset.

I was particularly interested in the role, duration, regimen and timing of surgery in the context of neoadjuvant radiotherapy for pancreatic cancer. Our experience in Glasgow is that it introduces new technical and peri operative challenges. The current JHH strategy is to offer 8 cycles of FOLFIRINOX followed by Stereotactic Body Radiation Therapy (SBRT). Surgery is then scheduled for four weeks post radiotherapy. Whilst it may be a function of an extremely large patient cohort, and with it the ability to select those with good performance status, the JHH approach was more aggressive than our own. For example, we discussed an 80 year old patient who had completed FOLFIRINOX and SBRT and was being scheduled for a Distal Pancreatectomy with Coeliac Axis Resection (DPCAR).

On day three of my visit I had the privilege of delivering a lecture on “Pancreatic Resection post Neoadjuvant Chemo Radiation”. I am extremely grateful to Dr Wolfgang and the pancreas team for this opportunity and for the great discussion that followed. Explaining to the Johns Hopkins group how to do a Whipple is perhaps the very definition of teaching one’s Granny to suck eggs.

After my lecture I joined Chris Wolfgang in the OR for a post chemotherapy Whipple. It was reassuring to see the same post treatment fibrosis and inherent challenges with dissection that we experience. Throughout my travels I appreciated my newfound or perhaps

reawakened fascination with the techniques and intra operative strategies of other surgeons. I absorbed these with the enthusiasm of a junior trainee performing their first appendicectomy and benefitted immensely from this aspect of my surgical journey. I was particularly impressed with Chris's use of cold scissors to develop the near-obliterated post chemo planes around the SMV and portal veins. It made a significant difference and is under-utilised as a dissection technique in an era where diathermy and other energy devices are the default position.

The following morning I sat in with the incredibly motivated research group who kindly presented and explained their work to me. The meeting started at 0630 hr and it was refreshing to see what could be achieved both clinically and academically without the constraints of the European Working Time Directive. I then attended Hospital Grand Rounds and the sense of pride the staff took in their institution was evident. A superb lecture on liver transplantation delivered by Dr Andrew Cameron with his mother and father (John) watching proudly. I reconvened with Chris in his office for yet another lab meeting. He is a true surgeon-scientist and actually delivers impressively on both fronts.

It was a real pleasure to meet Dr John Cameron again after 10 years. At 82 years old he stopped operating recently but remains active within the department. Interestingly, he was the James IV Association Travelling Fellow in 1974 and visited Sir Andrew Watt Kay in Glasgow (when I was 2 years old). We agreed this was an exciting time to be involved in pancreatic cancer surgery. Neoadjuvant therapy and vascular resections are game changers and it is likely that minimally invasive surgery will form at least a part of the future. He advised me to learn robotic surgery or I wouldn't be operating on the pancreas in 10 years! As someone who has performed more Whipple resections than any other surgeon (>2000 cases), and who devoted a lifetime to reducing the operative mortality of the procedure from near 30% to 1-2%, I should probably heed his advice.

I visited the Critical Care Unit in the afternoon to better understand the peri-operative approach to the pancreatic resection patients. I thoroughly enjoyed the discussion with the attendings and Advanced Nurse Practitioners. My overall impression was that their approach was very similar to our own - perhaps unsurprising as I'd visited JHH on my previous Fellowship with the aim of establishing a Pancreatic ERAS Programme in Glasgow. In common with most units I visited, they stopped using epidurals many years ago and instead rely on a variety of analgesics and local techniques for effective pain relief. Intravenous antibiotics were continued for 24 hours post op - and even longer in other units I visited - in contrast to our own approach of administering only in theatre.

That evening, Chris and the pancreas team treated me to a superb dinner at the Lebanese Taverna in the Inner Harbor. It was another opportunity for a relaxed discussion over drinks about pancreatic surgery and later, as the last diners to leave, life in general.

My final day with the JHH team was a tour de force of pancreatic surgery and underscores their reputation as leaders in the field. In one day I observed a completion pancreatectomy following a Whipple for main duct IPMN (in a patient with previous bariatric surgery), a robotic Whipple for a neuroendocrine tumour and a technically demanding Whipple post neoadjuvant chemoradiation. The latter case required an anterior approach to control the superior mesenteric artery and vein. The SMV was resected just above the tributaries and reconstructed with a left renal vein interposition graft. Chris and Will Burns scrubbed in together - another great example of the immeasurable benefits of two-consultant operating for the most difficult of resections. I thanked Chris and his team for a wonderful week and left for my hotel room to control endless venous bleeds with 6/0 prolene sutures in my sleep.

Perelman Center for Advanced Medicine

Hospital of the University of Pennsylvania

10 - 11 June 2019

The following morning I took the Acela Express, Amtrak's flagship train service serving the Northeast Corridor of the United States, from Baltimore Penn Station (right) to 30th Street Station, Philadelphia. A breakfast gin was again offered, this time without the excuse of poor flying conditions but accepted regardless. After a pleasant journey along the north eastern seaboard I checked in to my hotel and set out into the sunshine to discover Philadelphia.

Philadelphia is one of the oldest municipalities in the United States and a truly stunning city. I headed east along Walnut Street to the Delaware River waterfront, enjoying the views of the river across to New Jersey. On my return I made for Rittenhouse Square, a beautiful, buzzing oasis a few blocks from my hotel. Established in 1683, it is considered one of the finest public spaces in the US and was close to the scene of my one and only brush with law enforcement during my travels.

I was excited to meet with my host, Dr Charles Vollmer, again. Chuck and I first met when he visited our unit in Glasgow on a travelling fellowship in 2008. I reciprocated with a visit to Beth Israel Deaconess Medical Center the following year. We have remained firm surgical friends and he has been generous in including our data as part of his incredible and internationally renowned Pancreatic Fistula Study Group. He is now Director of Pancreatic Surgery and Professor of Surgery at the Hospital of the University of Pennsylvania (HUP).

We met in the impressive marble lobby of HUP and Chuck took me on a tour of the hospital. His knowledge of the past, present and future of his institution would put most surgeons to shame. Penn is truly massive. There are 110 hospitals in the “local area” but Penn takes 11% of the patients. Competition was evident with the pancreatic unit at Jefferson a short walk away. In contrast to the NHS, it was fascinating to see competition driving excellence and innovation in clinical care. Chuck showed me the evolving construction of the next phase of the hospital - a $1.4 billion extension dubbed “the battleship” (foreground below).

I was fortunate to spend all day in the outpatient clinic with Chuck and Amy, pancreatic Advanced Nurse Practitioner, who seemed to “make it all happen”. In contrast to other units I visited, which were very much cancer orientated, Chuck sees the full spectrum of pancreatology and

his practice was perhaps most similar to mine. This was a superb opportunity to drill down in to the nuances of pancreatic disease and discuss different approaches to the challenges we all face. I was struck at the level of detail discussed in clinic. This is a high information seeking patient population who are often well versed in their condition and in your own outcome data before arriving at clinic. As a result, the conversation during the consultation was enhanced and this appeared to manifest itself as a greater level of patient satisfaction. These satisfaction metrics are recorded and made available to each physician. This constant scrutiny and feedback in turn drives performance and exemplary care.

Pancreatic surgery in the context of patients with obesity poses its own challenges. I sat in on several post resection consultations with patients in the BMI 40-50 range who were making good progress following surgery. We discussed other public health issues including the “opiate epidemic” which has reached crisis point in the US and is now impacting on how physicians consider and manage post operative pain control.

After finishing clinic, Chuck took me on a tour of Philly on the way to his home for dinner. Again, and unsurprising to those of you who know of his attention to detail, his knowledge of the city’s history, culture and geography is encyclopaedic. I am extremely grateful to Chuck and Beth, his wife, for inviting me to share a wonderful dinner with their family at home (and for gifting me the beautiful hand crafted pottery piece I was admiring!). It is very easy to focus on the clinical aspects of this trip but the added value of discussing real life issues in a relaxed environment should not be underestimated. Chuck later escorted me to the nearby railway station to return to my hotel, handing me the required and pre paid train tickets - the last word in outstanding hospitality.

The following morning I attended the Pancreas Multi Disciplinary Meeting and participated in case discussions. I appreciated the opportunity to deliver a lecture to this group on "Extreme Pancreatitis", a concept we are developing in Glasgow to describe the classification and management of this challenging entity. Chuck led a highly informative discussion afterwards and offered his own characteristic insights in to these challenges.

During a tour of the adjacent Ivy League Medical School, Chuck and I discussed post operative pancreatic fistula (POPF) in some detail. He has blazed an academic and clinical trail on this topic and has a phenomenal understanding of fistula risk and mitigation strategies. I was interested to hear that he is using external pancreatic duct stents (5Fr paediatric feeding tubes) for the high risk pancreatico jejunostomy during the Whipple reconstruction. This was an emerging theme during my travels and whilst some surgeons have been employing internal or external PD stents for many years, it now appears to be gaining greater traction amongst a larger surgical body. Neoadjuvant therapy is not mainstream at Penn but they are starting to explore this approach and we discussed the possible benefits with respect to pancreatic gland texture and the potential to reduce fistula risk further.

Unfortunately, logistics dictated a relatively brief visit to Penn. After a fantastic two days with Chuck I boarded the Acela Express late that afternoon, bound for Boston and the final stop on my US travels.

Massachusetts General Hospital

Massachusetts, Boston

12 - 14 June 2019

After arriving late in to South Station Boston the previous evening I was very much looking forward to returning to The Massachusetts General Hospital. I visited the Mass Gen in 2009 and benefitted hugely from the experience as relatively junior consultant. Dr Cristina Ferrone kindly greeted me at the front entrance and introduced me to the GI Surgical Oncology Meeting. Dr Keith Lillemoe, Chairman of Surgery, and his entire team at the Mass Gen were extremely gracious and generous hosts and had even organised accommodation for me in a nearby prison (now converted in to a luxury hotel).

The GI Oncology meeting gave me a fantastic overview of the Mass Gen approach to various tumours including pancreatic cancer. They embraced the neoadjuvant strategy many years previously and have significant experience in radiation treatment for pancreatic cancer. As in other units I derived great deal from listening to the debate and discussion. As the chair of our MDM in Glasgow there are often various time pressures and competing priorities which can detract from the purely educational experience of simply listening to the views of others.

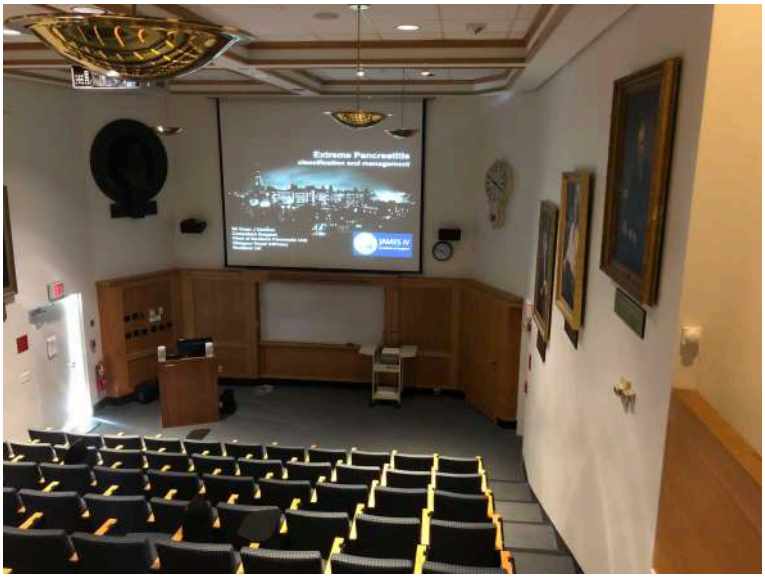
I was invited to attend OR 54 by Dr Motaz Qadan to observe him performing a Whipple resection for cholangiocarcinoma. This was an upfront resection with a predictably soft and unforgiving pancreas. His approach to mitigate the POPF risk is to make a very small enterotomy on the jejunal side and leave an internal pancreatic duct stent, again a variation on an emerging theme during my travels.

Dr Keith Lillemoe went above and beyond what one could reasonably expect of a host. I was given a detailed time table of a series of one-to-one meetings with the pancreas group. This was a superb opportunity to have a focused but relaxed discussion on my key areas of interest. Dr Lillemoe embodies the very essence of leadership and I was keen to explore this with him and his team.

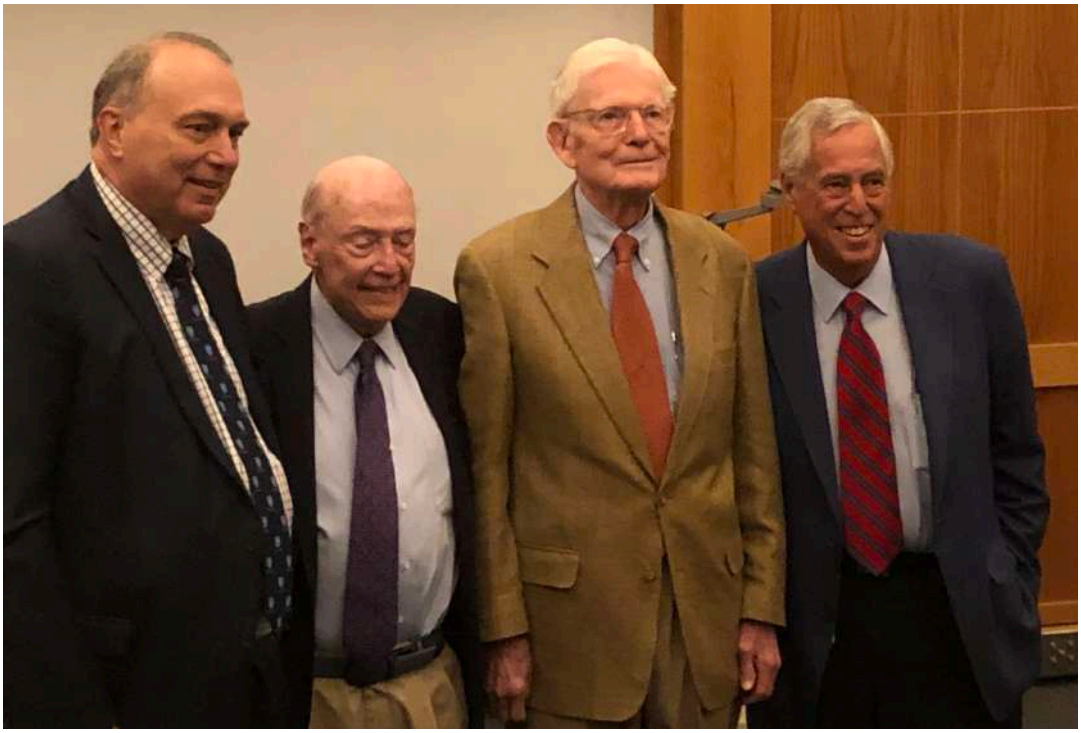
I met first with Dr Kenneth Tanabe, Professor of Surgery and Chief of the Division of Surgical Oncology. He offered some very insightful advice on surgical leadership and took time to describe his approach: *"By enabling others and taking them with you, you'll do much more good than by trying to do it all yourself".*

I then had the privilege of meeting with the legendary Dr Andrew Warshaw who is still contributing to the department at the age of 80 years, though he stopped clinical practice when he was 72. Given his lifetime's experience, I was keen to hear his views on the more "recent" advances in pancreatic cancer management. He is persuaded by the argument for a neoadjuvant strategy including chemo and radiotherapy, but consider the benefits of a minimally invasive approach to be perhaps limited to distal pancreatectomy rather than the Whipple resection. I'm inclined to share this view, given that the morbidity of a Whipple resection is almost always related to the pancreatic anastomosis rather than the surgical wound.

I enjoyed a further discussion with Dr Motaz Qadan who confirmed my thoughts that this is a superlative institution with an enviable culture of nurturing, enabling and supporting younger members of the team.



It was an honour to present again on “Extreme Pancreatitis” in the rarefied atmosphere of the Bigelow Lecture Theatre with portraits of the surgical greats staring down upon me. Dr Lillemoe again demonstrated great leadership and organisational skills by escorting us at pace to the nearby Fenway Park, home of the Boston Red Sox and the oldest park in Major League Baseball. Motaz Qadan and Alastair Young, a fellow visiting consultant from the Leeds Pancreatic Unit, joined us for one of the most memorable social highlights of my travels.



On the second morning of my visit to MGH I attended the Morbidity and Mortality Meeting. I was impressed by the quality of the presentations by the trainees and fellows and also by the absolute transparency of the discussion and willingness of all to learn collectively. Following on immediately from this was the annual Chairman's Lecture, delivered by Dr Lillemoe. This was one of the most inspiring, thought-provoking and all-encompassing presentations I've had the privilege to witness. It was delivered to a hugely appreciative audience with standing room only in The Bigelow Lecture Theatre. His in-depth knowledge of the current status of the entire Division of Surgery and the future direction of travel was humbling. Three of the previous Chairmen of the Division of Surgery attended (above), including one in his 95th year.

Following on from this I had a very informative discussion with Dr Matt Hunter. Matt was a James IV Travelling Fellow in 2014 and has a major interest in Quality Improvement, Safety and Risk. These align with my own interests and it was interesting to learn of his approach and how he endeavours to overcome the various associated challenges.

I am immensely grateful for the meeting I subsequently had with Dr Lillemoe in his office. He gave freely of his time to answer endless questions with patience. I was intrigued to explore his thoughts on surgical leadership and hear of how he creates a close "surgical family" and deals with conflict which inevitably arises in all high performing units. Communication, honesty and leading by example are key. I was honoured to be invited to write a short piece in a hard backed book he reserves for visiting clinicians, though it did provoke further anxiety regarding Imposter Syndrome.

The role of neoadjuvant radiotherapy for pancreatic cancer continues to evolve and given our own experience I was keen to discuss this further with Dr Ted Hong, Director of the Gastrointestinal Service in the Department of Radiation Oncology. He uses radiotherapy for all patients with pancreatic cancer. This is delivered either as 5Gy over five days with surgery up to two weeks later, or 50.4Gy over five weeks with resection at 4-6 weeks. Regardless of the approach they recognise an increase in vascular complications, mirroring our experience. The goal is negative resection margins and neoadjuvant therapy is part of the multi modal strategy to achieve this. He believes there is a likely survival benefit for pancreatic cancer as do the team at MGH. He was involved in the SPARC Trial (phase-I trial of pre-operative margin-intensified stereotactic radiotherapy for pancreatic cancer at high risk of positive resection margins) but in his words this was "brutal" and this again is entirely in keeping with our experience of SPARC. Radiotherapy is also used at MGH to treat lung and liver metastases from pancreatic cancer.

These views were emphasised during my subsequent discussion with Dr Carlos Fernandez-Del-Castillo (below right), Director of the Pancreas and Biliary Surgery Program: operate at four weeks after conventional long course radiotherapy, or two weeks after SBRT. Both of these regimens are preceded by 8 cycles of FOLFIRINOX as standard for pancreatic cancer, and regardless of regimen the post neoadjuvant fibrotic changes in the operative field are significant. In addition he has noted increased vascular complications with vein resection and reconstruction after radiation treatment. In an effort to mitigate the risk of POPF, Dr Fernandez-Del-Castillo continues to use external PD stents with most Whipple resections as he did when I first visited 10 years ago. I greatly appreciated his endless enthusiasm during our conversation.

That evening Dr Lillemoe arranged dinner in Toscano, a fabulous Italian restaurant. We dined privately in the underground Grotto and I am grateful to the whole team for making the time to join us.

On my final day at MGH I joined Dr Lillemoe in the OR for a Puestow procedure and Dr Fernandez-Del-Castillo for a neoadjuvant Whipple exploration which ultimately required double bypass for positive frozen sections around the coeliac axis and SMA.

I was interested to also meet with Dr Peter Fagenholz who, rather uniquely on my travels, has a significant interest in the management of acute pancreatitis including minimally invasive necrosectomy approaches. We had a broad-ranging discussion on the management of this disease including the decision-making, which in many ways is more complex than that required for the patient with pancreatic cancer.

I flew out of Boston that evening on a night flight to London and then on to Glasgow, reflecting on an incredible surgical journey on the first leg of my travels.

Amsterdam Medical Centre

Amsterdam, The Netherlands

5 - 7 August 2019

The European leg of my travels commenced in Amsterdam on Sunday 4 August 2019 after a short flight from Glasgow, this time with suitcase.

I met with my host, Dr Marc Besselink, for the morning handover meeting to discuss all current GI surgery inpatients. Marc and his colleagues have established a world leading reputation for academic excellence and have published extensively in most fields of pancreatology. After morning handover Marc gave me a tour of the research facility. This is an incredible set up and it became clear very quickly why the AMC is such an effective academic powerhouse. There were long stretches of corridors (right) with research fellows in multiple rooms, all working relentlessly in the field of pancreatic surgery. The Dutch Pancreatic Cancer Group and Pancreatitis Groups have, in my view, achieved more than any other collaborative to answer the latest clinically relevant questions across the entire spectrum of pancreatology. Marc, with his boundless energy, is instrumental in this process.

I joined Marc on rounds and I greatly appreciated his transparency regarding their post operative morbidity. This was a recurring and reassuring theme in every unit I visited. In particular, the MIS Whipple patients have the same complication profile as those having open surgery, again not surprising as the leaking PJ drives post operative morbidity.

We moved to theatre for two cases that day. The first was a revision of a pancreatico jejunostomy, which had been performed many years previously following trauma. This was a great opportunity to discuss the various options in a “non set-piece” procedure. We were able to cover a variety of topics and I was taken by Marc’s local anaesthetic technique. Following midline laparotomy, bupivacaine is injected under vision into the pre peritoneal space to provide pain relief during the procedure. Wound catheters are placed at the end to aid post operative pain control.

The next case was a robotic Whipple, which I viewed from the second console. The operative view was superb - the detail, lighting, magnification and 3D effect brought the surgery to life and I was able to appreciate tissue planes which are not readily apparent at open surgery. Marc and his colleague, Dr Olivier Busch, were great hosts and guided me through each step of their technique. I also found them exceptionally honest and humble despite their international profile. They are currently conducting a trial on robotic pancreatic surgery and acknowledge that we do not, as yet, have the data to confirm superiority of this approach over open surgery, particularly for Whipple resections. Marc’s view is that the robot will form part of the future, for perhaps 40% of cases, but that the challenges of the neoadjuvant dissection may still mandate open surgery for these patients. I was impressed by Marc’s anastomotic technique, employing a modified Blumgart pancreatico jejunostomy over a short internal PD stent for the reconstruction.

After a day of in-depth and enlightening discussion, Marc very kindly invited me to have dinner at home with his wife, Carlien, and his children. I enjoyed a superb home-cooked meal and I’m very grateful to Carlien, whom I suspect was the brains behind this! I then had the opportunity to experience the “real” Amsterdam - a bike ride past enormous windmills and along beautiful canal paths. The scenery was simply stunning in the orange glow of the setting sun.

After the morning handover meeting the following day, I joined the HPB MDM. This was another great opportunity to appreciate different approaches to the problems we all face and covered the full spectrum of benign and malignant pancreatic pathology. I am grateful to my hosts for not only involving me in the discussion but for conducting the entire meeting in English for my benefit. Humbling.

The next case in theatre that day was a laparoscopic RAMPS. The tumour had previously caused obstructive pancreatitis and as a consequence the dissection was technically demanding. I found Marc a very relaxed and enthusiastic host, always willing to answer questions and discuss options even during complex procedures where I think my bandwidth may have been struggling to compute. This was particularly true for the next case - a post neoadjuvant Whipple. The fibrotic changes were ferocious and Marc appeared genuinely interested to hear of my approach to this difficult situation in Glasgow. We had an honest and constructive exchange of views and it was the perfect summary of a James IV Travelling Fellowship in microcosm: surgeons learning from each other’s experience and both gaining

as a result. As we do in Glasgow, and in every unit I visited, Marc sought the counsel of his colleague. Dr Busch attended and scrubbed in for what we call a “mini, intra operative MDM”. Unfortunately, there was tumour involving the root of the SMA and infiltrating along the vessel. We all agreed that resection was hazardous and futile, and Radio Frequency Ablation was applied to the tumour.

On my third and final morning I had the privilege again of delivering a lecture on “Pancreatic Resection post Neoadjuvant Chemo Radiation” to the surgical group at AMC. I am very grateful to Marc for facilitating this and for coordinating a very useful discussion after my presentation.

I thanked my hosts and rushed to the airport for my next multiply delayed flights and missed connections. After two hours on the plane in Amsterdam (“IT issues”) we were granted permission to take off and I arrived late in to Verona for the next phase of my travels.

Chirurgia del Pancreas of Policlinico GB Rossi

Verona, Italy

8 - 9 August 2019

I finally realised, after standing outside what I now believe to be the local Post Office, that the hospital was in fact the massive building behind the one I was trying to access. I made my way to Chirurgia del Pancreas of Policlinico GB Rossi and received an exceptionally warm, Italian welcome from everyone I met in the Verona unit.

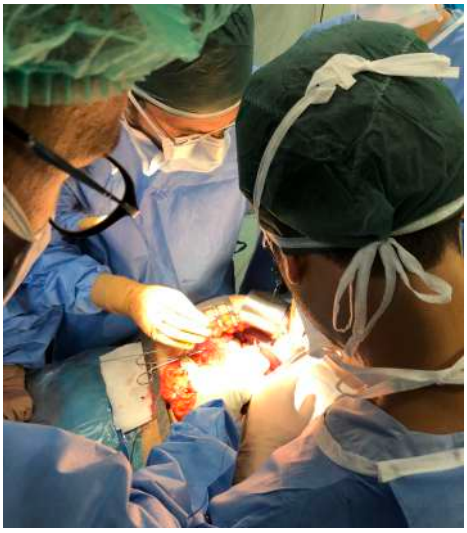
I had a brief tour with Dr Giovanni Marchegiani, who was extremely helpful, before joining him in theatre for a Whipple resection. Giovanni was superb at explaining the "Verona" Whipple technique and was able to take me through what he believes are the key steps and pitfalls. The Verona team, like many other units, have the Fistula Risk Score laminated on the theatre wall for ease of reference. For the high risk cases an external pancreatic duct stent is used. In my experience this tends to be a paediatric feeding tube or an umbilical catheter but the Verona group have managed to access a bespoke device for external PD drainage complete with insertion trocar. This greatly simplified what can often be a time-consuming part of the operation.

I was interested to see that there are 2-3 trainees assisting at each major resection. They were highly motivated, pro active and attentive. This model for education is, in our system, under utilised for a variety of reasons and it was refreshing to watch trainees learning how

to assist by observing a more senior trainee assisting the consultant. This is the “forgotten part” of surgical training with perhaps too much focus in our system on starting to operate before one has learned how to assist. For major, high tariff resectional surgery an able assistant is key to success of the procedure.

After theatre I attended the surgical planning meeting to discuss the cases scheduled for next week. This was invaluable. Whilst we discuss all our cases at MDM and personally review the information prior to surgery, this more formal approach in Verona was extremely useful. The pathology and radiology were reviewed to confirm the diagnosis and ensure all staging was complete. This was also an opportunity to discuss vascular anomalies and plan the surgical resection strategy. In addition, the anaesthetic team were present and this allowed a much more meaningful review of patient comorbidity and performance status. This meeting is all the more pertinent in the neoadjuvant era (which Verona have embraced and championed) with the associated intra operative challenges and potential for patient deconditioning following oncology therapy.

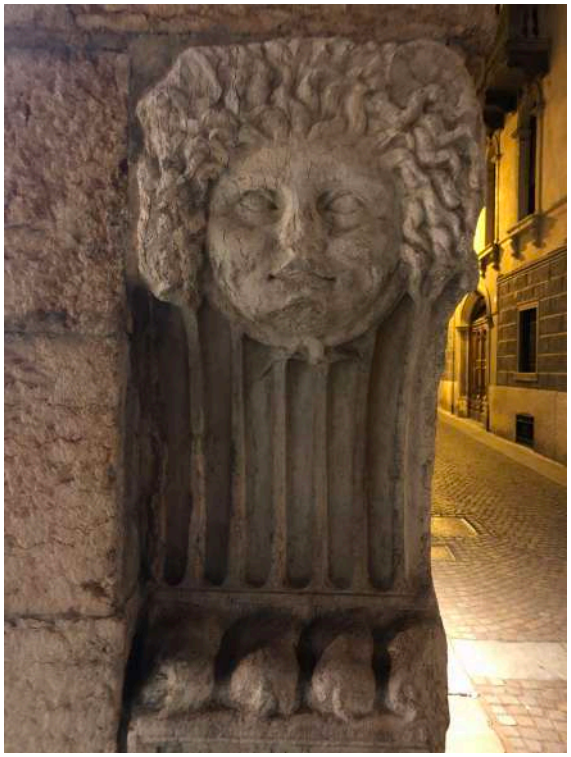
I was invited to deliver my lecture on “Pancreatic Resection post Neoadjuvant Chemo Radiation” to the group and we had another great discussion on this topic. Having now given this presentation on several occasions I was delighted to finally “get the T-shirt” which was presented to me by Dr Roberto Salvia, senior surgeon in the unit! Timing of surgery post radiotherapy was again debated and in alignment with the other units I visited, earlier resection at three weeks post radiation appears to be optimal. I had an informal and entirely unplanned meeting with several of the surgical trainees and residents later that day. Their enthusiasm and thirst for knowledge about our system and surgical practice were inspiring. My thanks to all of them for the endless fine Italian coffee which fuelled this conversation.



The following day we discussed all the current inpatients at the unit meeting - a good opportunity to recap on any significant events and outstanding issues. I then joined the team in theatre for a total pancreatectomy. The patient had main duct IPMN with suspected malignant change although the pre operative EUS FNB was not diagnostic. The trans gastric EUS puncture appeared to have resulted in a fistula between the stomach and body of pancreas, something we recognise in our EUS practice. The resultant inflammatory change was dramatic and on par with the changes associated with neoadjuvant therapy. Ultimately, three consultant surgeons and three senior fellows worked in perfect concert to perform the resection. Significant bleeding was encountered from sectoral collaterals as a result of complete splenic vein occlusion. Each bleed was carefully controlled with focus and patience. It was impressive to observe such a highly skilled and well-oiled surgical machine in action and a stark reminder that high acuity surgery is a team sport.

I was grateful for the opportunity to meet with Professor Claudio Bassi in his office after theatre. He gave graciously of his time and imparted a lifetime of wisdom over a proper Italian espresso. He was warm and friendly and has clearly managed to create an extraordinary surgical family rather than just a group of individuals working in the same unit. I enjoyed listening to his description of how he first learned to perform the Whipple procedure, and how he then translated this into one of the foremost pancreatic centres in the world. In keeping with the view of many senior surgeons I encountered, he can understand the rationale for laparoscopic or robotic distal pancreatectomy but remains “perplexed” at the notion of applying this approach to the Whipple. I share this view and I suspect only time, an open mind and data, will tell.

On the last evening I was invited to explore the ancient and beautiful city of Verona with Dr Antonio Pea, senior fellow in the unit, and Dr Alessandro Giardino. Alessandro was previously a fellow in our unit in Glasgow and is now an established HPB consultant in Italy. We discussed pancreatic surgery and life through the prism of an Aperol Spritz and they treated me to a fantastic meal in a specially selected restaurant!



48th World Congress of Surgery

Kraków, Poland

11 - 12 August 2019

I was fortunate in being able to incorporate a short trip to Kraków, where I was invited to present at the World Congress of Surgery and to participate in workshops for the International Association for Trauma Surgery and Intensive Care (IATSIC). This was a fortuitous opportunity to combine my Travels with my other clinical interest, trauma. I departed Verona and travelled to Kraków, via Frankfurt, on Saturday 10th August 2019. The location was of even greater interest to me as Kraków is my grandfather's home city.

The day after I arrived I took part in two IATSIC workshops at the invitation of Dr Tina Gaarder, my good friend and the President of IATSIC. In addition to the intellectual value of this experience it was a fantastic opportunity to catch up with other close friends and colleagues from the trauma circuit, including Simon Robertson, Steve Moeng, Adam Brooks (L-R below) and Frank Plani.

After a day discussing the future of trauma care including clinical, educational and academic strategies we headed in to the Old Town in the medieval centre of Kraków. We enjoyed drinks beneath the imposing Gothic towers of St. Mary's Basilica in the vast and beautiful Rynek Główny, the 13th century market square, before heading for dinner in the underground cellars of a nearby Italian restaurant.

The 48th World Congress of Surgery, incorporating the 69th Congress of the Association of Polish Surgeons, formally opened the following day. I'd been given the rather unfortunate title of "The Injured Pancreas: How I do it" and was unsure if my hosts wanted me to describe how I injure the pancreas during elective surgery. However, I gave the organising committee the benefit of the doubt and described my approach to (non-iatrogenic) pancreatic trauma, following significant and invaluable experience I gained during a Fellowship year in the Johannesburg Trauma Unit.

As always, time was of the essence, and after taking questions I walked (quickly) from the podium to a waiting taxi for John Paul II Kraków-Balice International Airport and a flight to Frankfurt.

MONDAY, 12 AUGUST 2019

Time	Session No./ Abstract ID	Organizing Society / Title / Speaker
16:17		VASCULAR INJURY MADE EASY Steven Moeng, South Africa
16:31		LIVER INJURIES: WHEN AND HOW TO OPERATE Adam J. Brooks, UK
16:45		THE INJURED PANCREAS: HOW I DO IT Euan Dickson, Scotland
16:59		MY TAKE ON VENOUS INJURIES: LIGATE OR REPAIR? Raul Coimbra, USA
17:13		PANEL DISCUSSION

European Pancreas Center

Heidelberg, Germany

13 - 16 August 2019

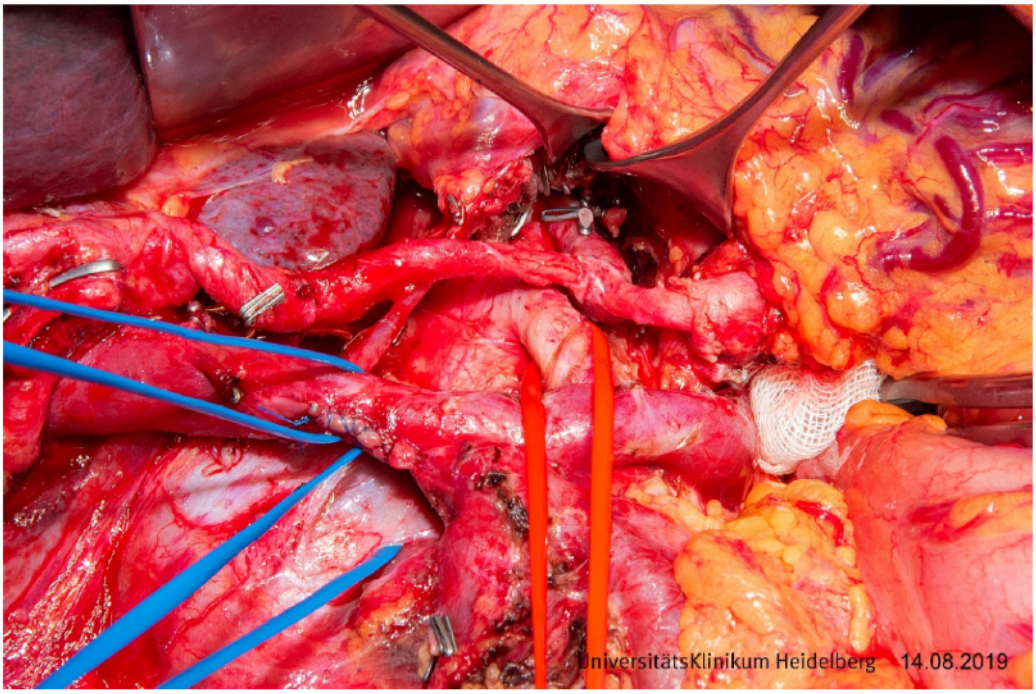
Against all odds I survived the shuttle bus journey along the autobahn with a driver who viewed speed limits as nothing more than a suggestion. The following morning I made the short walk across the bridge over the Neckar River to The European Pancreas Center at Heidelberg University Hospital. Unfortunately, both Professor Markus Büchler and Professor John Neoptolemos were on leave and I did not get the opportunity to meet with them during my travels. I am, however, very grateful for their assistance in arranging my visit and I was extremely well looked after by Professor Beat Müller and the Heidelberg team.

When I chatted with Prof. Müller over morning coffee the sheer scale of the Heidelberg surgical powerhouse became apparent. The unit performs approximately 700 Whipple resections per year in addition to the full spectrum of abdominal surgery including visceral transplantation. They have been performing pancreatectomy with arterial resection for at least 10 years, and complex venous resection is considered routine. This unrivalled experience in super high volume, complex pancreatic resection has forged a reputation for Heidelberg as the unit that may offer hope for patients with tumours deemed irresectable elsewhere.

The unit model was also unique in my experience - the surgeons operate (at least) five days per week and much of the peri operative care is managed by a dedicated critical care and ward based team unless there is a significant post operative issue. These are true multi visceral resection surgeons. In addition, the massive volume of transplantation contributes to surgical skill with vascular reconstruction techniques, which are then transferable to pancreatic resection.

After coffee we made our way to OR 11 to observe a Whipple with portal vein resection. The surgical techniques I witnessed in every case in Heidelberg were radical and meticulous. In contrast to nearly every other unit I visited, they do not employ a neoadjuvant strategy

unless there is clear evidence of arterial involvement on initial staging. Most patients are offered exploration after neoadjuvant therapy for locally advanced pancreatic cancer even if there still appears to be arterial involvement. Each Whipple is performed as an artery-first approach and a TRIANGLE procedure is then performed (below – red sloop on SMA, upper blue sloop on portal vein)). This technique, developed in Heidelberg, involves sharp dissection along the coeliac axis and the superior mesenteric artery. All the soft tissue in the "triangle" bounded by these two arteries and the SMV/portal vein is then removed. This was a lesson in radical foregut / midgut vascular skeletalisation to obtain negative margins.



The surgeons took great care to explain and demonstrate this technique and generously gave me annotated, anonymised photos from the cases I observed. A photo was taken at the conclusion of each resection "for the boss to see" - impressive quality control! On this occasion the portal vein was resected with a calm and effortless end-to-end reconstruction. Venous interposition grafts are rarely required in Heidelberg and instead liver mobilisation and a Cattell-Braasch manoeuvre were employed to facilitate a tension-free anastomosis. I learned great deal from watching this masterclass in venous reconstruction and I was interested in the use of Doppler to quantify flow after release of the vascular clamps.

The scrub nurses in each case were super attentive, focused and pro active. As in several other units, they stood on theatre steps throughout the case and faced directly on to the

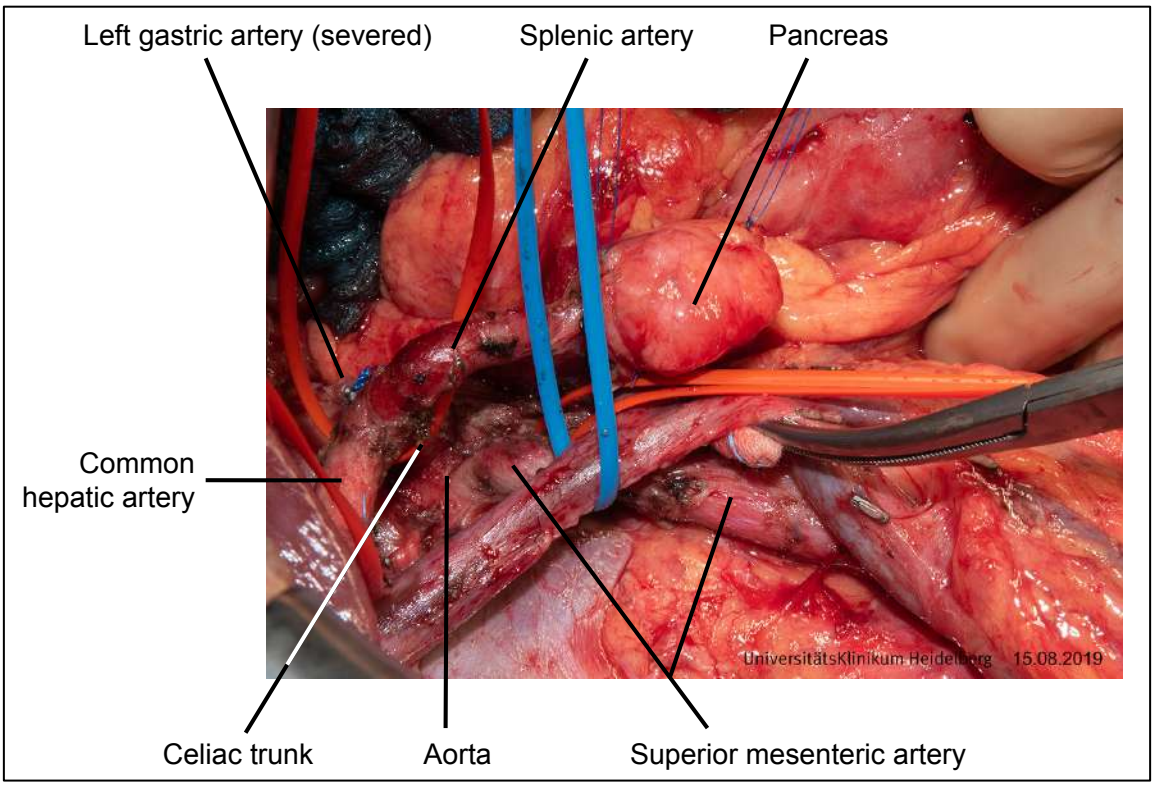
surgical field. From this elevated position they gained a superb view of the procedure as it evolved and were able to rapidly anticipate the next step.

The following morning I was spoiled for choice as the Heidelberg team performed four pancreatic resections (including three Whipple procedures) in one day, perhaps more than some UK units perform in a month. I briefly observed the initial steps of a robotic distal pancreatectomy, then moved to OR 15 for a completion Whipple after a previous distal resection for IPMN. On test clamping the gastroduodenal artery there was a marked reduction in flow through the hepatic artery proper. Unfazed, the team cleared all the soft tissue from around the origin of the coeliac axis and divided the median arcuate ligament. After confirming satisfactory flow through the hepatic artery proper with Doppler, the resection continued without incident. In an adjacent theatre I took the opportunity to observe a combined Whipple with right nephrectomy for metastatic renal cell carcinoma. Again, the benefit of institutional and individual surgical volume was evident: each surgeon operating entirely within their comfort zone in a wide range of multi visceral procedures.

On day three of my visit I had the pleasure of again delivering my lecture on pancreatic resection post chemoradiation after the morning handover meeting. The venue was the historic original operating theatre with traditional steep gallery-style seating. I had a particularly entertaining and robust discussion with Prof. Schneider afterwards whilst Prof. Müller looked on (nervously!).

I was keen to understand the pathways for post operative care of the patients and visited the intermediate care unit after dusting myself down. As one would expect, radical high volume surgery has its associated morbidity but this was extremely well managed and protocol-driven by a very experienced peri-operative team.

I observed (yet) another Whipple with TRIANGLE procedure and was grateful to Prof. Schneider for taking time to expose the anatomy, explain the concept and even send me an annotated photo of his dissection. All the vessels were carefully slooped prior to wedge-resection of the spleno-portal confluence and we discussed the role of using peritoneum as a venous patch if required. A Cattell-Braasch was used to good effect to increase vascular exposure, with the caveat that a full mobilisation carried the risk of the small bowel volving on the SMV and occluding venous return.



In the adjacent theatre I watched Prof. Müller perform a total pancreatectomy in a patient with an exceptionally high BMI. This was a considered, gentle but radical dissection in a challenging abdominal environment.

At dinner that evening in a local Italian restaurant, Prof. Müller and I enjoyed a wide-ranging discussion on topics from pancreatic anastomoses to work-life balance for surgeons. We agreed that neither of us had a watertight solution for either of these challenges. I was intrigued by his approach to ERAS (Enhanced Recovery After Surgery). We introduced this in Glasgow nearly a decade previously. Our view is that it works by simplifying and standardising peri operative care, and minimises iatrogenesis by "de-medicalising" patients as soon as practical after surgery. Prof. Müller perhaps sums this up more eloquently and succinctly: *"just do as little as possible afterwards and the patient will get better"*. The very definition of ERAS.

On the final day of my Fellowship I was again immersed in theatre, this time observing Prof. Mehrabi perform an inferior vena cava resection for a locally advanced right adrenal tumour. As I watched the surgical team in action with another complex procedure I reflected on the immeasurable benefits of working in a super high volume institution. The Heidelberg surgeons operate with the quiet confidence of those who do this every day of the week and, as importantly, have the immediate support of a very large, well-organised and highly skilled team to support them in the event of an intra operative issue. The surgery was, again, meticulous and controlled, following his mantra of *"always be safe*".

I boarded a flight that evening to return to Glasgow after a truly remarkable and inspirational surgical adventure.

Reflections

Several themes emerged during the course of my travels and may be best considered collectively.

Surgical technique is but a small part of being good surgeon, and having been a consultant for 12 years I was reminded of the life-long learning process that defines operative surgery. It was immeasurably profitable to observe a wide range of surgical techniques and I was fascinated by the relative minutiae, which are too many to describe in full.

Cold scissor dissection was used by some surgeons to good effect, particularly for vascular exposure. There was significantly less collateral damage when compared to the use of energy devices or right-angled dissecting forceps. Bipolar diathermy was also used extensively, where our practice favours conventional pencil-tip devices.

One of the main aims of my travels was to observe vascular exposure, resection and reconstruction techniques and this experience was illuminating. Venous resection, as in our unit, was considered a standard procedure. This is much more challenging after neoadjuvant therapy and it was reassuring to observe the same technical issues we have encountered. Vein resection and reconstruction were performed predominantly by pancreatic surgeons with occasional input from their vascular colleagues. Whilst interposition grafts were routine for some, others maintained that adequate mobilisation enabled an end-to-end reconstruction in most cases.

Arterial resection including coeliac axis, superior mesenteric and hepatic arteries was performed in selected centres. The resection was usually performed by the pancreatic surgeon with reconstruction by their vascular colleagues. Whilst the post operative morbidity of arterial reconstruction was significantly greater, the resection was less challenging than that required for the superior mesenteric or portal vein. This is simply a function of the tissue handling characteristics of the relatively thin-walled, friable vein compared to the more robust arteries. It was interesting to note the greater intra operative anxiety regarding vein resection compared arterial resection, with an appreciation that the former is entirely unforgiving. Total pancreatectomy was performed in the context of arterial

reconstruction and significant efforts were made to place native tissue (e.g. omentum, falciform ligament) over the vascular anastomoses. Tissue glue was often used to enhance this cover.

Pancreatico jejunostomy was performed exclusively in the cases I observed, with pancreatico gastrostomy employed rarely. A pinhole enterotomy was made in the jejunum and non absorbable sutures used in some units for the anastomosis. The use of pancreatic duct stent - internal or external - is increasing as a fistula risk mitigation strategy. The ultimate risk mitigation strategy is, of course, total pancreatectomy and in some units this is used occasionally for the extremely soft, fragile pancreas where reconstruction would inevitably fail.

Surgical drains are used routinely in most units but, increasingly, a stratified approach is used according to the Fistula Risk Score. High risk patients may have two surgical drains and an external PD stent; intermediate risk mandates one drain and perhaps an internal stent; the low risk patient may have no drain or stent.

The length of the gastro duodenal artery stump has long been debated, with some advocating flush ligation on the hepatic artery and others opting for a longer stump. My own experience of flush ligation is that in the event of a bleed one is left with a side hole in the hepatic artery which requires control with a covered stent placed by interventional radiology. Depending upon the angulation of the hepatic artery these stents are prone to thrombose and occlude with the potential for liver ischaemia. Most units, therefore, favoured leaving the GDA stump as long as possible to provide a target for IR embolisation coils in the event that haemorrhage control is required.

Post operative salvage strategies were appropriately aggressive and pro active. Intravenous antibiotics were used routinely for up to a week and there was a very low threshold for commencing total parenteral nutrition in the context of pancreatic anastomotic failure. Hepatico jejunostomy leaks were managed with PTC for external drainage in some instances and intra operative bile cultures used to dictate antimicrobial therapy. An arterial and venous contrast enhanced CT scan was performed early, sometimes on day 1, for suspected

vascular reconstruction complications. Interestingly, covered portal vein stents were used to manage venous bleeds or thrombosis after vein reconstruction.

I was immensely impressed at the absolute transparency with which each surgeon I met discussed peri operative morbidity. It was these candid exchanges in conjunction with superlative hospitality that firmly cemented lifelong surgical friendships. Pancreatic resectional surgery is a high tariff endeavour. It is incumbent upon us to mitigate the associated risk through multi disciplinary teamwork, careful patient selection and appropriate intra operative strategies. Equally, if not more, important is the recognition of inevitable surgical morbidity, with early utilisation of effective rescue strategies.

It was reassuring to observe that we all face the same challenges. In an era of careful patient selection and diligent pre operative assessment of comorbidity, it is pancreatic anastomotic failure that continues to drive the “spiral of doom”: pancreatic fistula followed by intra abdominal sepsis and ultimately haemorrhage in some cases. Further, the collateral damage from control of haemorrhage may be thrombosis and subsequent ischaemia. I absorbed a great deal observing very skilled, high performing teams battle these significant challenges to achieve the best outcomes for their patients.

One of the most striking themes throughout my travels was surgical volume. The volume-outcome relationship, both for individual surgeons and for institutions, has been recognised for some time and is well documented. The volume of Whipple resections undertaken per annum in the units I visited ranged from 100 to 700. To put this in context, there are approximately 100 Whipple procedures performed per year in Scotland. These are undertaken across five units. This should give us pause for thought regarding the future of relatively low volume, high acuity surgery in the UK.

The theatre etiquette in every centre I visited was impeccable. Each operating room was calm, controlled and respectful. There were no raised voices or unnecessary background conversations. The ethos of a Sterile Cockpit was very much embraced.

There appeared to be a senior scrub nurse for each case I observed. These complex, high tariff procedures were not deemed appropriate for junior members of the scrub team

without the immediate oversight of a more experienced member of staff. This is very much aligned with how we endeavour to teach our surgical trainees and recognises the immeasurable positive impact a very experienced scrub practitioner has on the procedure (and the surgeon!). It would be unthinkable to expect a junior surgeon to perform a Whipple without supervision and it was refreshing to observe the same standards applied to all members of the multi disciplinary team.

In many operating rooms the scrub staff and surgical assistants used standing stools. This elevated position afforded them a better overview of the operative field and enhanced their ability to anticipate, assist and recognise intra operative challenges. There were often two or more surgical trainees scrubbed for each case. The more junior trainee learned how to assist, an under-rated and lost art in itself, by directly observing the consultants and senior trainees assisting each other.

I was interested to note that nearly every doctor I met across four states and three countries wore a white coat. In our culture these are much maligned and I'm aware of the infection control arguments. My observation is that doctors looked like doctors, and perhaps as a subliminal consequence this contributed to the professionalism and sense of "belonging" to the team that was evident in every unit. These issues clearly run deeper than a "uniform" but it was interesting nonetheless.

As someone who performs pancreatic resections I was fascinated to observe the impact these demanding procedures have on the surgeon. As a disconnected observer without the responsibility of actually performing the case, but understanding the difficulties and challenges of each step, it was immediately apparent. The enormous physical stresses of prolonged musculoskeletal contortions and the mental burden of intense, sustained concentration are perhaps under recognised. It was easy to spot potential "frustration points", changes in surgical tempo and the impact of fatigue on decision-making during long and complex procedures. My observation is that these are largely mitigated by two-consultant operating and this strategy is used to good effect in the units I visited as well as my own.

It is tempting to focus on the positive aspects of different healthcare systems during one's travels. Of equal importance is to remember what we do well in our own institutions. For example, and in contrast to most units I visited, a large part of my practice focuses on complex benign pancreatology including severe acute pancreatitis. The decision-making in particular for this patient group often presents even greater dilemmas than those encountered in malignant pathology.

My hosts were intrigued (and rather envious!) to learn that the surgeons in our unit perform pancreatic endoscopy (endoscopic ultrasound and ERCP). This is rather unusual even in the UK system but is an invaluable asset and allows us to manage the entire spectrum of pancreatology.

Finally, my travels brought the enormous benefits of the NHS in to sharp focus. Despite the seemingly insurmountable challenges we face, our healthcare system should be celebrated for what it does for so many with a relative paucity of resource.

The Value of a James IV Travelling Fellowship

I devoted much time during my travels, and since, reflecting on why this is such an invaluable, unique and extraordinary opportunity. Surgery is a craft specialty. It is an apprenticeship and the requisite knowledge, technical proficiencies and decision-making skills are acquired over the course of a career. Whilst there are valuable adjuncts to this journey - educational meetings, conferences, journals and online resources - there is no substitute for the stimulating and exciting experience of spending time in the company of another surgeon. It's how we foster lifelong friendships and learn the art, craft and science of surgery.

In an increasingly digital, distance-learning, homogenous, one-size-fits-all era, the James IV Travelling Fellowship captures the essence of this immersive method of exchanging surgical knowledge and keeps it very much alive. There are some things you just can't Google.