ELECTIVE (SSC5c) REPORT (1200 words)

A report that addresses the above four objectives should be written below. Your Elective supervisor will assess this.

Elective Report: Renal Medicine

Renal Unit, Southend University Hospital

Word Count: 1192

To gain further insight into renal medicine within the NHS and be able to discuss it in the context of global health

I spent 6 weeks at the Renal Unit in Southend Hospital (which has had the best survival rates for patients on haemodialysis in the country for the past 3 years), focusing on patients on haemodialysis and it was a great learning experience. Chronic kidney disease (CKD), a long-term condition, affects over 1.7 million people in the UK aged above 18 years of age most of whom require renal replacement therapy – which mainly comprises of haemodialysis, peritoneal dialysis or a kidney transplant. It was quite striking to see the number of young people on chronic haemodialysis after failed transplants, which I was not expecting, and I learnt that there is a huge issue of non-compliance with medications after transplants in young patients. With regards to complications, those with end stage renal disease are at greater risk than others of developing renal cancer but the leading cause of death in this population is from cardiovascular disease regardless of what stage the patient is at.

Describe how renal services are delivered in the UK and how does this contrast with other countries?

Renal replacement therapies such as haemodialysis are expensive so although access to these services have progressively increased in middle-income and developed countries, it is still unaffordable for a huge part of the global population, particularly in developing countries. For this reason, many patients are dying from untreated kidney failure in other parts of the world. Those cases are very unlike the care received here in the UK where not only are we able to better afford these services but services themselves are widely available to patients with funding from the state and taxpayers.

What are the most common problems within renal medicine and how are they dealt with?

Chronic kidney disease is a large burden on the population and the commonest causes are diabetes and hypertension. Other causes can be infectious such as glomerulonephritis and pyelonephritis or

vasculitic conditions such as Goodpasture syndrome to name a few. During this placement I was able to see rarer causes too such as Alport's syndrome in one of our patients on haemodialysis. Of course, it is imperative to control risk factors and incorporate lifestyle changes but once diagnosed the main objective is to halt or slow down progression. Medical interventions before someone progresses to requiring renal replacement therapy include blood pressure control, erythropoietin replacement and the use of phosphate binders. After this, with disease progression, patients will usually go onto dialysis or receiving a transplant.

To gain confidence in the skills required for becoming a competent FY1 and to gather data for work on a renal audit

As part of this placement, I worked on an audit where we looked at aortic stenosis in the entire population of all the patients on haemodialysis in the renal unit. Previous studies, though scarce, have shown that haemodialysis is a significant risk factor for the progression of calcific valvular disease, in particular aortic valve stenosis. It has been demonstrated that patients on haemodialysis tend to have an accelerated progression of aortic stenosis. Not only does this population have a greater cardiac output that results in biochemical and haemodynamic changes which exert stress and fibrotic effects on the heart valves, but they also have raised levels on calcium-phosphate product. High levels of calcium-phosphate product predispose patients to a phenomenon known as calciphylaxis where calcium and phosphate are deposited in other areas of the body except bone. Cardiovascular calciphylaxis not only results in coronary calcification but also leads to gradual thickening of valve leaflets. Treatment for aortic stenosis would ideally involve and aortic valve replacement (AVR) and certain criteria would require to be met by the individual patient to be a candidate for such intervention. Those at risk of rapid progression of aortic stenosis, such as patients on haemodialysis, may therefore benefit from earlier intervention.

In this observational study out primary aims were to investigate the prevalence of aortic stenosis in our haemodialysis population; to identify those with a high risk of progression of aortic stenosis in order to intervene and prevent mortality or cardiac events; and to refer patients at high risk of progression of aortic stenosis for AVR as appropriate.

In the first stage we collected baseline data required for this study from our patient group, which included a full cardiovascular examination and review of previous echocardiograms in all patients. We focused on detecting systolic murmurs and whether they met certain criteria that indicates moderate or severe artic stenosis. We used 4 criteria that included: slow rising carotid pulse, low pulse volume, maximal murmur intensity in the second intercostal space and reduced intensity of the second heart sound.

We then reviewed echocardiograms and our main variable that we focused on in was the ΔPPG as a marker of the severity of AS progression. Patients were consequently divided into two groups

according to the ΔPPG (which signifies the progression, or lack of, between the initial TTE and the follow-up TTE). The rapid progression group was determined by a ΔPPG of >4.5mmHg/year and the slow progression group was determined by <4.5mmHg/year. We also recorded patient age and length of time on HD (years) as well as clinical biochemistry parameters: parathyroid hormone (PTH), serum corrected calcium level (Cas), inorganic phosphate (Pi) and calcium x phosphate product (CaXPi).

We found that 34% (n=41) of all our patients on haemodialysis had aortic valve disease. Within this group, there were 5 patients for whom there was insufficient data to obtain a ΔPPG value. So of the remaining 36 patients, 11% (n=4) had a ΔPPG of more than 4.5mmHg/year and therefore in the high risk of progression to AS group whilst 89& (n=32) had a ΔPPG of less than 4.5mmHg/year and therefore in the low risk group. We identified 18 patients, regardless of their ΔPPG values but according to whether they met 3 or 4 criteria suggesting moderate or severe aortic stenosis, as those who require a priority echocardiogram. This will enable us to monitor the ΔPPG in these patients. From the data we have, we were unable to find any positive correlation between a high serum calcium-phosphate concentration and high risk of progression to aortic stenosis. We expected those who had been on haemodialysis for longer to be at greater risk also due to the increased length of time that would supposedly allow for more calcification to occur. However, we found that that was not the case and someone who had spent a relatively less amount of time on HD was just as much likely to be at high risk of progression to AS.

In this audit I performed cardiovascular clinical examinations on all the patients on haemodialysis and corroborated my findings with the renal consultant as part of a screening process for detecting patients who may have aortic stenosis. This process allowed me to really develop my examination skills further and become much more confident in detecting murmurs and being able to describe them more accurately. I also become familiar with using the hospital's IT system to look through patient records and retrieve data from their previous echocardiograms and blood test results to analyse for this audit. I was then able to present our findings to the weekly cardiology meeting at Southend Hospital. I feel that these experiences will greatly help me throughout my training and it has encouraged me to seek out further research and audit opportunities. Of course, this audit is not yet complete and I hope to continue work and follow-up of patients on this.