

RCPE Casenotes: Past & Present Podcast - Renal Transcript

Narrated and curated by Dr Daisy Cunynghame, heritage manager and librarian at the Royal College of Physicians of Edinburgh.

[introductory music]

Welcome to the Royal College of Physicians of Edinburgh's Casenotes podcast. Over the next few months we're going to delve into the different physician branches or specialties.

Just to start off with, what is a physician? Most people know what a GP is, and what a surgeon is, but not everyone knows exactly what a physician does. Well the formal description is specialists in internal medicine, so diseases and complaints that happen inside your body. And even if that sounds unfamiliar, you have almost certainly heard of a lot of the areas that this covers, like cardiology, diabetes, allergies, palliative care, infectious disease and neurology. These are all branches of medicine, or specialties, that physicians are responsible for.

In each coming episode of Casenotes we will pick one of these specialties and delve into its history, looking at its development over hundreds of years, and some of the interesting stories and cases from the past. We'll also talk to a current physician working in that area, to find out what it is like to be working as a specialist physician in the twenty-first century.

[musical interlude]

So today we're looking at nephrology, or the diagnosis and treatment of diseases of the kidney. We'll begin with a look at the history and then speak to Professor Neil Turner about his experiences working as a nephrologist, and finish up with a historical case study.

I'm not going to try and tell the whole history of diseases of the kidney throughout time. Instead we're going to focus particularly on the 1700s – the period known as the Age of Enlightenment – a time when some really important changes were taking place.

So first I'd like to say that for a long time – until well into the 1800s – it was very difficult to know what was happening inside a patient's body, and whether the symptoms they had related to the kidney (and therefore urinary disease) or venereal disease, or another internal complaint. So it is really hard to separate the history of diseases of the kidneys from the diseases of other internal organs. It was often only later, after the patient had died, when an autopsy was carried out, that the real cause of the patient's disease was known.

In the 1700s physical examination of patients was limited, usually for reasons of modesty, or propriety, and there were no effective tools that could look inside the body to examine it more closely. Cutting a patient open to examine them was far too risky in a time before antiseptics or anaesthetic.

You can't tell much by statistics. Studies of kidney and urinary complaints at institutions like the Royal Infirmary of Edinburgh show the number of cases of inflammation of the kidney, incontinence of urine and inflammation of the bladder massively decreasing, while what was termed 'uterine diseases' went up. Some of these fluctuations were probably due to changes in systems of disease classification rather than any change in actual instances of particular symptoms or complaints. The terminology used to describe diseases was in a state of flux in the 1700s – new terms were developed, then discarded, and yet newer ones replaced them.

According to doctors of the time, symptoms of kidney disease could be confused with a wide range of other complaints, including syphilis, rheumatism, tuberculosis, ulcers and gout. Over the course of the 1700s, urinary complaints were increasingly seen by many medical practitioners as not themselves distinct conditions, but rather as symptoms of separate diseases. In his book, titled *A General System of Surgery*, the German surgeon Lorenz Heister argued that urinary incontinence could be an indication that the patient suffered from bladder stones or another bladder-related condition.

In the case of one Edinburgh dispensary patient, Frances Clerk, the physician treating her identified the existence of a stone in her bladder not only by her impeded urination, but by Clerk's report of abdominal pains and the appearance of sand in her urine. According to the

physician's notes, although this stone could be "remov[e]d by cutting", Clerk was unwilling to undergo this procedure. The physician went on – "Of this mode of cure then [it is] unnecess[ary] to say [any] more", before resorting to a range of medicines.

Regardless of such concerns, over the course of the 1700s surgical intervention increasingly became the preferred mode of treatment for this condition, rather than the prescription of medicines. Previously considered to be primarily the preserve of folk healers, reputable surgeons who were known for their skill in the process of lithotomy began to rise to prominence and hospitals employed such specialists in increasing numbers by the end of the century.

But for those like the Edinburgh dispensary patient who dreaded the idea of surgery, thankfully it was not the only option. Treatments for kidney disease, particularly kidney stones, were some of the most common recipes to be found in medical texts in the 1700s.

William Buchan, a Scottish physician and Fellow of our College, discussed kidney stones at length in his celebrated book titled *Domestic Medicine*. Buchan stated "Bleeding, as far as the patient's strength will permit, is necessary... After bleeding, [concoctions of] warm water...or... mild vegetables [should be created]...Cloths dipped in these must be applied to the part affected".

Kidney stones, according to Buchan, were caused by high living, the use of strong wines, a sedentary life or an astringent or windy nature. He recommended food which promotes secretion of urine – including onions, leeks and celery. The most proper drinks are milk, barley water and liquorice water. Every morning the afflicted person should drink a pint of oyster water and eat an ounce of alicant soap, which was a type of soap made from olive oil; as well as used for kidney stones, it was also used in perfumes.

Other treatments from around the same time were a little more appealing, with one, from a book titled *Taylor's Ready Doctor*, recommending "1 pint of white wine and nutmeg and a little sugar to be drunk each morning". Although the same book contained another recipe for kidney stones which involved dissolving 144 black snails in fortified wine.

Another medical text from the 1700s recommended onions and hog's grease applied to the skin; vinegar to induce vomiting; eating almonds, burnt eggshells and wine; eating turpentine, butter and liquorice. The household recipe book of Jane Taylor holds some similar ingredients, although at least in this case you weren't supposed to eat them: "Take a handful of fresh butter, as much as a nut, and half as much black soap. Stamp and fry them and make a plaster and lay them to the navel".

[musical interlude]

Daisy: So welcome, thank you for joining us, Neil. So could you just start off by just telling us a little bit about who you are?

Neil: Yeah, thanks very much Daisy. So I'm Neil Turner and I've been Professor of Nephrology here in Edinburgh since 1998, so quite a few years now, after a quite broad background in general medicine and a research spell in London when I did some really molecular things too.

Daisy: Thank you very much. So if we just start from the absolute sort of beginning or the absolute basics – how would you define your specialty, what it encompasses, you know, what it's all about?

Neil: Yes, it's far more varied than I thought and we'll really get a chance to talk about why I chose it, but I think to the public perception kidney doctors look after people with kidney disease and hopefully prevent them from needing dialysis and transplantation. But if they do, they also look after them then, and because that's been hived off into renal units it's become quite far removed from everybody's experience, except that because transplantation and dialysis have been so successful, people are now bumping into those patients everywhere. So I think people are a little more aware of it, but it's still got an air of dark mystery around it which, well, I hope we'll break through some of that in this conversation.

Daisy: Yes, well, very much hope so. I also wanted to ask you, and I don't want to make you feel old, but over the course of your working life, how do you feel that nephrology has changed, you know, what sort of direction has it kind of gone in? Are there are major innovations that you can think of?

Neil: Well, there've been quite a few major innovations but I think the most, the biggest change, has been the way, just thinking of the way when I started nephrology, the average age of patients was young and the ability to treat all the patients who needed it was seriously limited, and staffing on renal units was incredibly thin. You know the workloads were dangerous or at least very difficult to manage, and the need for treatment was much greater than we could provide. And I think the greatest change has been: we aren't in that position now. So we aren't in the position where we turn people down because there isn't treatment and people aren't being referred to who us who we might not, who might benefit, so that's a massive change.

And of course it's required quite a lot of changing in the way we worked in order to achieve that, so I think, although this was well underway by the time I got into nephrology, one of the biggest shifts has been from a specialty which was almost entirely doctor-driven, it's really become multi-professional. So now there's a lot of nurse-led and other specialist-led aspects to the work, whole dialysis units are nurse-led and this would have been inconceivable in the very early days.

And I think a change that I, that really reflects the outpatient care and preventive management of kidney disease is, I didn't think I would see in my professional lifetime the stabilisation of the number of patients on dialysis, but actually we have seen that, particularly in Scotland in the last decade. The numbers of patients treated by dialysis has been stable or even falling, and the reason it's falling is because more of them are transplanted, so transplantation has just got better and better year by year as things have gone along. And I guess that improvement in transplantation has to be one of the key changes. There have been others – the ability to treat anaemia, and I have to say the availability of treatments to reduce the risk of kidney disease getting worse and needing dialysis.

Daisy: Thank you very much, that's fascinating. So we've done the past, so I guess we should talk about the future now. So, you know, with your sort of, you know, magic looking glass, where do you think, you know, nephrology is going to go, what are the changes going to be in ten or twenty years' time, do you think?

Neil: Well, the news at the moment is full of these ideas that we're going to be able to put animal organs into people, but people have been, you know, and remove the need for dialysis cause we'll be able to do animal transplants, but I have to say that I think that's still quite far off as a treatment, and we're still going to be dependent on human transplantation. I think that will continue to improve, which is fantastic news. There haven't been massive, no huge leaps in the way we treat patients who need dialysis, actually, since the 1980s, and a small incremental improvement perhaps, but there have been and will continue to be, I think, real progress with preventing people from getting to end-stage renal disease. Of course I mentioned that the dialysis population is stable but the number of people we look after is increasing because people survive with transplants, so I definitely don't see nephrologists being out of work, even if we do much better at preventing the rate at which people come in to need dialysis.

Daisy: Well that leads me on quite nicely, I think, to the people who will be in work, which is, you know, the next generation of specialists. So there may be people listening to this podcast who are at school thinking about, you know, going and studying medicine or who are currently studying medicine and thinking about how to specialise. So, you know, what would you recommend for those who are considering or open to the idea of nephrology, you know, what are the steps they should take to get there?

Neil: So this is a, perhaps a more common question of junior doctors than from the general public, because unless you've got kidney disease in your family, it's not the first thing you think of when you wonder about being a doctor. I always tell people, there's no point in being a nephrologist unless you are good at and really enjoy general medicine, because once these patients are yours for life, all the health problems that they develop, you need to be ready to look after and pass on or manage. It really is an extraordinary range, right from almost being general practitioner type care for some patients, to very long-term management of some difficult chronic diseases, some of which are just kidney disease, but patients have other conditions too and they need management, and it's usually the nephrologist who becomes the one who coordinates that care. So you have to enjoy general medicine and you have to like people, because there are this cohort of patients that you look after very long term. Having said that, once young people see

nephrologists, I think they mostly see a very engaged, interested bunch of doctors, of every shape, size, gender, that you can imagine, almost all of whom look as if they feel they're doing something worthwhile and enjoying it, and there's no better message than that.

Daisy: Thank you very much, that's, yeah, no, that's really interesting, although I like to think there is no medical specialty where they hate people, but, you know.

Neil: Yeah, let's hope so.

Daisy: So I'm particularly interested in, sort of, how we got here, you know, the history side of medicine and of your specialty as well. So I'm interested, are there any moments from the history of medicine or people from the history of medicine that you find particularly inspiring? You know, it could be ancient Greece or Rome or it could be fifty years ago, but is there anything that sort of sticks with you as being inspirational?

Neil: Yeah, with many specialties it's core [?] sort of technique based, isn't it? I'm very interested in the history too, but it doesn't really go back to ancient Greece, you can stretch it. No really, until the 1950s nephrology was a quite cerebral subject and the, mainly people, the nephrologists were studying physiology – so what happens to salts in different circumstances and lots of complicated studies – but it was completely transformed by the invention of dialysis. And actually in the UK there was quite a lot of resistance to taking on dialysis as nephrologists, it's difficult to think who else would do that apart from kidney specialists, but they really were, there really was some resistance, particularly from some academic departments. And therefore you have to say that in terms of historical figures it's got to be Willem Kolff, this amazing doctor who, under Nazi occupation in a district hospital, did experiments with dialysis – on patients because there weren't any animal experiments to be done – and eventually got his technique working, and saved lives with dialysis.

So the invention of dialysis was a big thing, but that was all for acute, temporary kidney failure at that point. And I've mentioned already that a huge part of a nephrologist's work is patients with long-term disease, and I think if you have to pick out one character who made a massive

impact on that it'd be Belding Scribner, who was an eccentric nephrologist in Seattle, who lived on a houseboat for a good part of his life and raised lots of money from benefactors in order to make some of these early treatments possible. I mean, in 1961 he brought a patient to a kidney meeting, just to show that – this is completely new to people at that time – just to show that you could keep people alive for more than a few weeks. In other words that it was a treatment that could be used for long term, for chronic kidney disease. And it was quite difficult for people at that point who were struggling to deal with acute renal failure, acute kidney injury with complicated dialysis machines, to think how on earth this could become a long-term treatment, but here was someone who believed it could and was prepared to stand up and say so, it was a pretty amazing moment.

Daisy: Thank you. So I have a feeling that I maybe can already guess what your answer to my next question is going to be, but this is something that I again, I'm quite enthusiastic about. So imagine for a moment that we have a museum of medicine, and every single specialty has an object which summarises or gives insight into that specialty. What is your one object for nephrology?

Neil: Well you're right, it probably is a dialysis machine. What else could it be? Well, you know, I think the other thing which has made such an enormous, huge difference is transplantation, but I'm not sure, apart from a kidney, what you'd display for that.

Daisy: Yeah, I think I'll maybe stick with the dialysis machine, and not try and source a human kidney at the moment. So you've talked quite a lot about your experiences and recommendations for how to get into nephrology, so what do you think ultimately makes a good nephrologist? What makes people good at your specialty?

Neil: There used to be a sort of jokey interview panel question, in which it was suggested that, is there a question that you could ask someone that – off-topic – that would really show whether or not they were suitable for your specialty, and the one for nephrology was: do you keep your bank statements? And it's true. In the days when we did have paper bank statements, most nephrologists I asked this question to did have their bank statements going back for more than a decade, and in some cases thirty or forty years. But it's, that's interesting. So clearly

they have to have very long-term interest in how things go and the things isn't money in an account, it's actually patients. So I think it is being interested and caring about this particular bunch of patients struggling with really difficult circumstances through thick and thin.

Daisy: And do you know the bank statement question is fascinating, I wouldn't have thought of it, but yes, having a long-term view, yeah, that makes a lot of sense. So I'm afraid my final question is the sort of inevitable question. So we're talking in February 2022 and so we can't not mention the COVID pandemic. So I'm interested, you know, how has this impacted on your work, how has this impacted do you think on your specialty more generally?

Neil: Yeah, it's been a really difficult time for everybody, hasn't it? The, clearly in the, particularly in the first wave, many of us were part of the people who were moved over to help with coping with the enormous number of admissions. So some colleagues were right in there in the high dependency areas looking after patients who were at the very extreme end of treatment, and others were trying to keep the service running, despite the depleted numbers and the more difficult circumstances. And as the epidemic/pandemic extended, that latter problem really began to cause increasing trouble. It turned out that many of our patients were very vulnerable, all our transplant patients were immunosuppressed, our dialysis patients turned out to be at least as vulnerable as the transplant patients, and many patients with chronic kidney disease were at some increased risk as well, some of them because of the drugs they were on and some of them just because of their renal impairment.

So it was that aspect, but there was also the difficulty of following people up and I think it's undoubtedly been the case that we've had a number of mishaps because patients were not followed up as frequently; because they were followed up remotely and we were therefore missing things; or they were not telling us things that we would have picked up if we'd seen them in person. And some of the work, really, really important work to keep people well and prevent them from getting progressive kidney disease, well we missed out on improving the management of quite a lot of patients across two years, by seeing them less often, by them not getting referred and, you know, when we think of memorable patients, there's nothing worse than people you know having some sort of

disaster and actually there's been a lot of that in the last two years. People who should not have reached end-stage renal disease who had to start dialysis; transplants that failed or had some mishap because of missed treatment or missed rejection and so on; as well as the direct consequences of COVID. So, tough, and we really, really do hope we're near the end of that, and I think we have got back to a much better mode of managing the patients in these circumstances, but actually we've achieved that by really pushing to have more face-to-face appointments again. So we've changed to some degree, and to continue more remote monitoring and probably those have been advantages, but I think we also appreciate the limitations of that kind of care.

Daisy: Thank you so much, Neil, that was really fascinating.

Neil: Thank you very much indeed, Daisy, a pleasure.

[musical interlude]

Our patient case study today is Maria Schafstadt. In 1945, Maria was a sixty-seven-year-old widow, who had been imprisoned for collaborating with the Nazis. In that year, 1945, she became a patient of Dr Willem Kolff. Kolff was a Dutch physician whose development of what he called an artificial kidney – what we now know as dialysis – revolutionised the treatment of kidney disease. Kolff was not the first to theorise that such a tool could be developed, but he was the first to successfully put it into practice.

Kolff's work had faltered once before. When key individuals at the university where he worked were replaced by Nazi sympathisers, he moved from there to a hospital in a small remote town. The tools he had available for the development of the world's first functioning kidney dialysis machine were limited. He used orange juice cans, bed slats, a bathtub and parts from the radiator of an abandoned car and from a downed Luftwaffe airplane. There was no blood pump as such – a rotating drum, along with gravity, moved the blood out of the patient and then back again.

On the 11th of September 1945, after the Netherlands had been liberated, the comatose Maria was brought from prison to Kampen Hospital, where Kolff worked, with end-stage renal disease. Kolff had

trials his prototype dialysis machine on other patients previously, but without success. After eleven hours Maria awoke from her coma and seven days later her kidneys were fully functional. Maria was the first patient whose life had been saved by dialysis. Maria died seven years later of an illness unconnected to kidney disease.

Kolff, widely considered to be the “father of artificial organs”, emigrated to the United States in the 1950s. He received many honorary doctorates and awards during his lifetime. Kolff donated the five dialysis machines he created to hospitals across the world. He also gave a set of blueprints for his dialysis machine to another researcher, based at Peter Bent Brigham Hospital in Boston. This led to the manufacture of a much more advanced dialysis machine, the Kolff-Brigham machine. For the first time there was an effective treatment available for acute renal failure.

[musical interlude]

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