



Some Surgical Problems in Diabetic Patients

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To illustrate some of the surgical problems in diabetic patients, I would like to present three patients. The first patient has been taking insulin longer than many of the people in this audience have been living. He is the oldest living juvenile diabetic in the United States. He had diabetes at birth. His mother took him to Boston in 1922 at the age of 17 months, in very bad shape. He was seen by Dr. Joslin and was worked up by a young intern whose name was Priscilla White. He began to get insulin in very small doses because there was not very much insulin available at that time. He has been taking insulin ever since, and at present he takes 40 units a day. He has gotten along extremely well with very few complications or difficulties until about three or four years ago when he began to have intermittent claudication. When this first came on, he could walk about six to eight blocks before he began to have pain in his calves. Later this progressed to the point where he could walk only 75 feet. It was at that point that we came in contact with him and he was admitted to the hospital here. Work-up included various arteriographies and these demonstrated blocks in both iliac systems and in both of the superficial femoral arteries. He underwent a bypass graft from the aorta to both femorals and a bypass graft from the femoral on the left to the popliteal on the left. Since this time he has been getting along very nicely. I asked him just this afternoon how well he could walk and he said he could carry a 75

pound tool box five blocks without any difficulty at all. So he seems to be pretty well over his claudication.

The next patient I would like to present is a woman of 33 who has been a diabetic since the age of 6. She has been taking insulin since the age of 6 and now takes about 65 units a day. She is a graduate nurse, so that sterile techniques have been no problem to her, and she got along very well with few complications until about two years ago. At this time on a routine checkup it was noted that she had albuminuria. Her BUN was 37 mg%. No specific treatment was undertaken. She went along doing her housework and not having any particular difficulty until December 1964, about a year ago. At this time she noted that she was tiring much more easily than she had and was feeling weak. She again consulted her doctor who discovered that her hemoglobin was down to 5 gm% and her BUN had now risen to well over 100 mg%. She obviously had severe renal disease. Later she was admitted here for study as a possible candidate for transplantation. Her renal disease had advanced to the point that her creatinine clearance was below 2 cc per minute. She was dialyzed in preparation for transplantation and a transplant was carried out about eight months ago, using a cadaver transplant because we were uncertain as to the outcome in a diabetic patient and did not want to use a living donor. Since this time she has been getting along quite well. We did not take out her kidneys at the beginning because, although

there were very small quantities of urine being formed, it was desirable to get a little bit of urine to follow her diabetic status. One of the most serious problems was that it was very difficult to dialyze her because as a rule a dialysis bath contains 2,000 mg% of glucose, and every time she was put on dialysis, her blood sugar rose to 2,000 mg%. She would be given more insulin and the next thing you knew the blood sugar was down to about 15 mg% and she was in insulin shock. Dr. John O'Brien and the other people in renal physiology finally came up with a formula which worked very nicely. They reduced the glucose in the bath to 200 mg% and used suction on the bath to extract the fluid instead of relying on the osmotic effect of excess glucose. With experience they were able to maintain her pretty well on dialysis, although this was really a major feat. She has gotten along very nicely since the transplant. She did remain somewhat hypertensive. We did not take out her own kidneys prior to the transplant, but because she was still hypertensive, she came back about a month ago, and had both her own kidneys taken out. Since that time, she has continued to stay on her insulin dosage. She is living at home and is getting along nicely. Her BUN is down to 17 mg%, her serum creatinine is 0.8 mg%, and her creatinine clearance has risen to 100 cc per minute. Her blood pressure is still elevated somewhat, but not as much as it had been prior to the nephrectomy and it is gradually coming down. Her eyegrounds at the present time are essentially normal. One of the problems is that she is on prednisone, which has made the management of her diabetes a little more difficult than usual and it also has had some tendency to keep her blood pressure elevated more than it would be otherwise. I think that as we decrease her prednisone, which we are gradually doing, her blood pressure will come down. She is now on 15 mg a day

and is only taking 5 more units of insulin than she did before.

My third patient is 67 years old. She has had a great deal of difficulty with vascular disease. She is not a severe diabetic. She developed her disease only a few years ago and has been treated pretty well with tolbutamide (Orinase). Four months before she came in, she developed gangrene in the second toe on the right foot which had become severely infected. A month before she came in, she developed an ulcer between the fourth and fifth toes of the same foot and had severe rest pain in bed. She had an arteriogram and underwent a femoral-popliteal bypass graft on the right. After this the second toe healed up and she was able to walk very nicely. She also had rather severe arteriosclerotic heart disease with angina and was taking nitroglycerin and had some EKG changes of myocardial ischemia, but no definite recent myocardial infarct. She came back in April 1963 with gangrene of the fourth toe on the right foot at the margin of the previous ulcer. This had to be amputated. The base of the toe bled nicely and the amputation healed promptly without difficulty. She then came back in January 1964, this time with an ulcer on the left heel. This was a rather large ulcer. Sometime between April 1963 and January 1964, she had suffered a myocardial infarction which was easily demonstrable on her EKG. She had severe angina and was in congestive heart failure. Some people thought that perhaps the ulcer on her foot was a neurogenic ulcer and it was felt that she would not tolerate any operative procedure because of her severe cardiac state. It was recommended that no treatment be carried out at that time for her leg and foot. However, she was not able to walk because of the ulcer, which was large and dirty, involving almost the whole heel. She was having a lot of pain and was beginning to have ascending infection from the ulcer.

We went ahead and carried out a femoral-popliteal graft on the left. After this she did very nicely. She was discharged and followed in the clinic and the ulcer finally healed completely. Ever since this time, she has been able to get along very well. She walks as far as she wants to, has not had any pain at rest, claudication, or further difficulty with ulceration.

These patients illustrate some of the more perplexing and challenging surgical problems in diabetic patients. There are many others, but these are particularly gratifying because only a few years back the circulatory problems in the lower extremities were treatable only by high amputation, and in the case of kidney disease with renal failure, there was no other treatment at all.