Venous Backflow in a Patent Polytetrafluoroethylene Arteriovenous Graft

—A case report—

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We report a case of a 48-year-old woman with end-stage renal failure who had a Polytetrafluoroethylene graft for hemodialysis and who had developed complications of venous outflow stenosis and venous backflow. Although venous backflow is an harbinger of graft failure, it is not enough reason to abandon the graft immediately. The patient was able to utilize her graft for 6 further months.


Key words: 1. Polytetrafluoroethylene
2. Arteriovenous shunt, Surgical
3. Shunts

CASE REPORT

A 48-year-old woman was diagnosed with end-stage renal failure, secondary to diabetic nephropathy, and hypertension for five years prior to admission. She was admitted with symptoms of general weakness and myalgia with an increased level of blood urea nitrogen and creatinine (90/8.7). Three days after admission, a permanent hemodialysis access catheter was inserted and on the fourth day, dialysis commenced.

Two weeks after admission, a Polytetrafluoroethylene (PTFE) arteriovenous graft operation was performed in her right forearm. A 6 mm carbon lined Impra-expanded PTFE graft was used (CR Bard, Inc.). The arterial anastomosis was done at her brachial artery and venous anastomosis at her antecubital vein. Arterial-graft anastomosis was done at an arteriotomy of 7 mm and venous-graft anastomosis at a veinotomy of 8 mm. Preoperative duplex sonogram had shown a diameter of 4.4 mm at her brachial artery and 3.7 mm at her antecubital vein.

The patient was then discharged at her postoperative 11th day. She had been using her graft for hemodialysis access two weeks after the operation and had visited our outpatient clinic at her postoperative 19th day with complications of venous outflow stenosis and venous backflow. Fear of occlusion and the need for another operation for hemodialysis access was met and an emergency duplex sonogram was performed. The duplex sonogram of her right arm revealed outflow stenosis of unknown origin with a patent PTFE graft, arterial side and venous side anastomoses. Strangely, the backflow to her cephalic vein reached the collaterals of the

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본 논문의 저작권 및 전자에 의해 저작물은 대한홍부외과학회에 있다.
Fig. 1. (A) A computer tomographic angiogram of the patient's forearm showing venous backflow reaching the collaterals of the dorsal venous arch with continued flow to the basilic vein. (B) An illustration showing the path of the venous backflow (blue) to the patient's basilic vein. The patient's brachial artery is shown in red and her graft in black.

dorsal venous arch and the flow continued through to the basilic vein. A computer tomographic angiogram of her right arm (Fig. 1) confirmed flow to her basilic vein and decision to use her graft continuously was made. The patient has continued to use her graft for 6 months without significant venous hypertension in her right distal extremity. Venous hypertension then had progressed and a graft salvage procedure described by Schulak[1] was performed at another hospital. The patient has been on dialysis with the use of the salvaged graft until presently, for four months.

DISCUSSION

Ever since the PTFE graft was introduced in 1976, the graft has been widely used as a secondary access method for maintenance of hemodialysis[2]. The patency rates for PTFE grafts vary from 70~84% at one year and from 62~64% at three years. The most common complication of the graft is occlusion caused by thrombosis or narrowing of the graft as a result of intimal hyperplasia[3]. Other complications include infection, pseudoaneurysm formation, steal syndrome, kinking, bleeding, venous hypertension, seroma, wound dehiscence, and distal emboli[3-6].

The cause of early period occlusion, usually from thrombosis, is not clear. Flexion of the elbow, creating kinking of the graft at the venous outflow, dehydration and low perfusion state, prolonged compression of the relatively immature graft for hemostasis at the needle puncture site, or clotting of the dialysis lines and apparatus are possible explanations[7]. Our case presented venous outflow stenosis distal to the venous anastomosis of unknown origin and venous backflow, eventually leading to venous hypertension. A duplex sonogram was helpful to detect the backflow and collateral to the basilic vein and confirmation was made by computed tomographic angiogram (Fig. 1). Venous backflow may be an harbinger of graft failure, but, venous hypertension and severe swelling of the forearm is a definite indicator of a need for graft revision or creation of a new access. The patient was able to utilize the graft for 6 months, before venous hypertension and forearm swelling occurred. We believe that it is not necessary to immediately forfeit the initial graft with venous backflow unless there is substantial venous hypertension and forearm swelling. Close observation is needed, so that a salvage procedure or revision may be possible. In 1991, Schulak proposed a salvage procedure of the forearm looped grafts, combining reversal of the blood flow direction of the graft and extension of their venous limbs along the ulnar aspect of the elbow[1]. Our patient underwent such an operation and was able to continue the use of the graft until today.

REFERENCES

참 고 문 헌


= 국 문 조 록 =

대퇴동맥을 통한 검사 후 대퇴동맥 전자부위를 다루는 기존적인 방법은 수술적으로나 기계적으로 말락을 가지고 4시간 내지 8시간 동안 허혈인정을 취하는 것이었다. 그러나 이러한 방법은 심한 불편함과 위험이 지연시키는 문제점이 발생하였다. 이에 따라 최근에 지혈을 위한 많은 장치들이 개발되었다. 이러한 장치들은 극소적인 지혈을 총합하기 위해 클라텐을 사용하고 있다. 하지만 이런 장치들은 사용에 따른 많은 문제점들이 국제적으로 보고되고 있다. 그리고 본원에서는 안정적 실험이므로 인한 우측 대퇴동맥 손과 동맥에 발생한 혈전증을 수술로 성공적으려 치료한 결과를 얻어서 이를 보고하는 바이다.

중심 단어: 1. 지혈
2. 혈전증