

개존되어 있는 인조혈관(Polytetrafluoroethylene)에 정맥성 역류

— 1예 보고 —

전 순 호

Venous Backflow in a Patent Polytetrafluoroethylene Arteriovenous Graft

— A case report —

Soon-Ho Chon, M.D.

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.

(Korean J Thorac Cardiovasc Surg 2005;38:389-391)

- 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

*한양대학교 구리병원 흉부외과학교실

Department of Thoracic and Cardiovascular Surgery, Hanyang University Guri Hospital

논문접수일 : 2005년 2월 14일, 심사통과일 : 2005년 3월 28일

책임저자 : 전순호 (471-701) 경기도 구리시 교문동 249-1, 한양대학교 구리병원 흉부외과

(Tel) 031-560-2300, (Fax) 031-568-9948, E-mail: shchon@hanyang.ac.kr

본 논문의 저작권 및 전자매체의 지적소유권은 대한흉부외과학회에 있다.

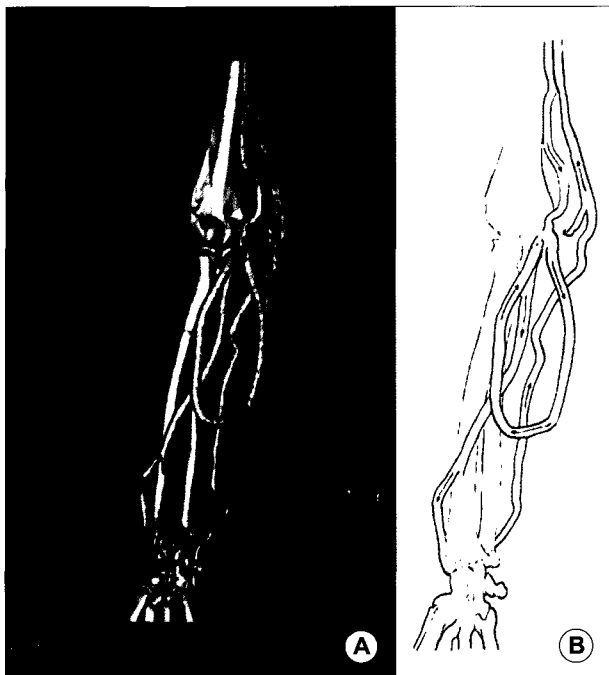


Fig. 1. (A) A computer tomographic angiogram of the patient's forearm showing venous backflow reaching the collaterals of the dorsal venous arch with continued flow to the basilic vein. (B) An illustration showing the path of the venous backflow (blue) to the patient's basilic vein. The patient's brachial 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

1. Etheridge EE, Haid SD, Maeser MN, Sicard GA, Anderson CB. Salvage operations for malfunctioning polytetrafluoroethylene hemodialysis access grafts. *Surgery* 1983;94:464-70.
2. Baker LD, Johnson JM, Goldferb D. Expanded PTFE subcutaneous arteriovenous conduit; an improved vascular access for chronic hemodialysis. *Trans Am Soc Artif Intern Organs* 1976;22:382-7.
3. Tordoir JH, Van Baalen JM, Haeck LB. Doppler ultrasound diagnosis of complications of polytetrafluoroethylene (PTFE) graft shunts. *Neth J Surg* 1984;36:42-4.

참 고 문 헌

1. Baims DS, Knopf WD, Hinohara T, et al. *Suture-mediated closure of the femoral access site after cardiac catheterization: result of the suture to ambulate and discharge (STAND I and STAND II) trials.* Am J Cardiol 2000;85:864-9.
2. Abando A, Hood D, Weaver F, et al. *The use of Angioseal device for femoral artery closure.* J Vasc Surg 2004;40:287-90.
3. Sprouse LR, Botta DM, Hamilton IN. *The management of peripheral vascular complications associated with the use of percutaneous suture-mediated devices.* J Vasc Surg 2001;33:688-93.
4. Carey D, Martin JR, Moore CA, et al. *Complications of femoral artery closure devices.* Catheter Cardiovasc Interv 2001;52:3-7.
5. Sanborn TA, Gibbs HH, Brinker JA, et al. *A multicenter randomized trial comparing a percutaneous collagen hemostasis device with manual compression after diagnostic angiography and angioplasty.* J Am Coll Cardiol 1993;22:1273-9.
6. Brachmann J, Ansah M, Kosinski E, et al. *Improved clinical effectiveness with collagen vascular hemostasis device for shortened immobilization time following diagnostic angiography and percutaneous transluminal angioplasty.* Am J Cardiol 1998;81:1502-5.
7. Ernst SM, Tjonjoegin RM, Schrader R, et al. *Immediet sealing of arterial puncture sites after cardiac catheterization and coronary angioplasty using a biodegradable collagen plug results of an international registry.* J Am Coll Cardiol 1993;21:851-5.
8. Kussmaul WG, Buchbinder M, Whitlow P, et al. *Rapid arterial hemostasis after cardiac catheterization and percutaneous transluminal angioplasty-results of a randomized trial of a novel homeostatic device.* J Am Coll Cardiol 1995;25:1685-92.

=국문 초록=

대퇴동맥을 통한 검사 후 대퇴동맥 천자부위를 다루는 기본적인 방법은 수동적으로나 기계적으로 압박을 가한 후 4시간 내지 8시간 동안 침상안정을 취하는 것이었다. 그러나 이러한 방법은 심한 불편함과 퇴원을 지연시키는 문제점이 발생하였다. 이에 따라 최근에 지혈을 위한 많은 장치들이 개발되었다. 이러한 장치들은 국소적인 지혈을 촉진하기 위해 콜라겐을 사용하고 있다. 하지만 이런 장치들을 사용함에 따른 많은 문제점들이 국제적으로 보고되고 있다. 그리고 본원에서는 안지오-셀 사용으로 인한 우측 대퇴동맥과 슬와동맥에 발생한 혈전증을 수술로 성공적으로 치료한 결과를 얻어서 이를 보고하는 바이다.

중심 단어 : 1. 지혈
2. 혈전증