

1

2

5

22 (2 - 4)

CT

, 2

가

3

CT

0.016 - 0.17%

15 - 61%

가

(1).

1991

2004

,

, 가

5

31

. 1945 Linton White (2)

(20 - 46)

가

3

2

(

(3 - 7),

, ,)

(Computed tomography: CT)

5

가

5

¹
²가

4 L4~5, 1 L5~S1 Pituitary 2
Rongeur forcep (Cook, Bloomington, U.S.A.)
(Terumo, Tokyo, Japan)
22 3 2 12 mm,
3 1, 2, 4 3 cm
2 3 가 가
2 가
3 1
(Fig. 1). 2
CT CT
5 30%
2 67%
3 (Table 1). , 3% 가
L3~4
L4~5 L5~S1
(3).
L4 (median
sacral artery), (inferior mesenteric
artery), (superior rectal artery)
(8 - 11).
3
1
2
1 1/3 가
가 (Gore)
가

Table 1. Summary of 5 Patients with Arteriovenous Fistula

Patients	Sex/Age	Laminectomy level	Clinical diagnosis	Fistula Site	Interval	Treatment
1	F/36	L5/S1	Heart problem	Lt, IIA-EIV	3 months	OP
2	F/24	L4/5	Cardiac A-V shunt	Lt, CIA-CIV	4 years	OP
3	M/28	L4/5	DVT	Rt.CIV-Lt.CIV	2 years	OP
4	F/46	L4/5	DVT	Rt.CIV-Lt.CIV	1 year	SG
5	F/20	L4/5	DVT	Rt.CIV-Lt.CIV	2 months	SG

Note. IIA, internal iliac artery

EIV, external iliac vein

CIA, common iliac artery

CIV, common iliac vein

DVT, deep vein thrombosis

OP, operation

SG, stent graft

Pituitary Rongeur forcep

(hypertrophic spur)

(3, 5).

5

20 30 가

가

. 1)

2) anterior annulus fibrosis
longitudinal ligament)

(anterior

, 3)

pituitary Rongeur

(3).

, 4)

, 5)

가

가

가

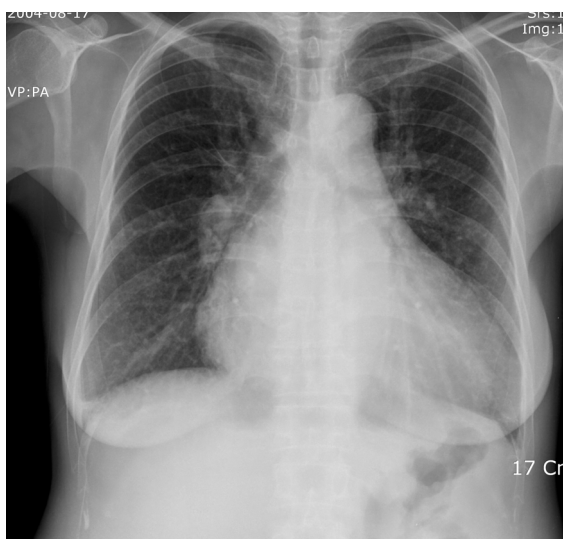
, 6)

가

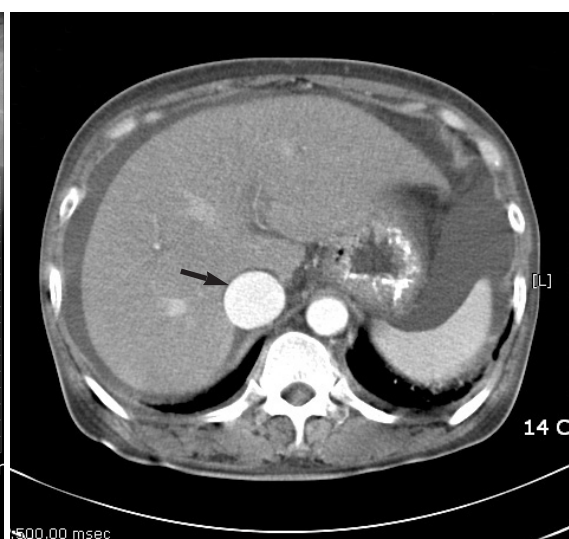
가

가

(3).



A



B



C



D

Fig. 1. Arteriovenous fistula in 46-years-old female after lumbar discectomy.

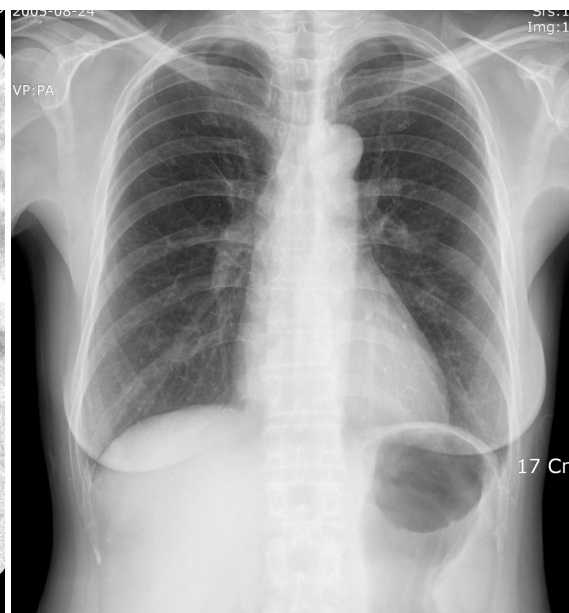
A. Initial chest P-A shows the increased cardiothoracic ratio.

B, C. Images of contrast enhanced abdominal CT obtained one year after discectomy show the small amount of ascites and early enhanced dilated IVC (arrow) and iliac vein (arrows).

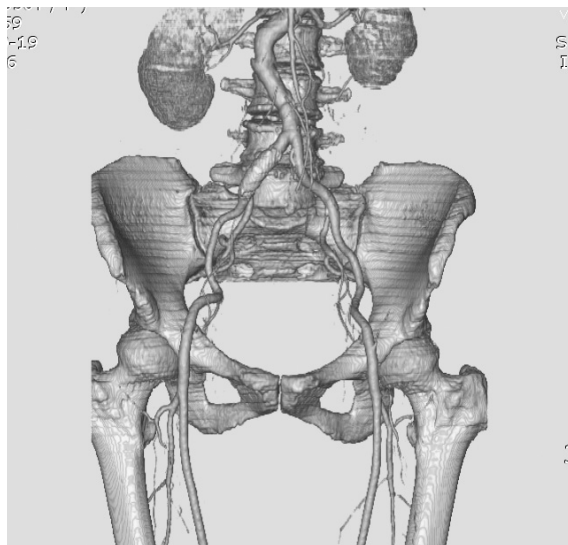
D. Aortogram shows direct high flow shunt from right common iliac artery to left common iliac vein.



E



F



G

Fig. 1. E. Aortogram shows complete occlusion of fistula tract with preserving both iliac arteries after insertion of stent-graft (10 mm in diameter x 30mm in length).
F. Follow-up chest PA shows normal size of heart.
G. Follow-up CT angiogram two year after insertion of stent-graft shows occlusion of fistula with preserving iliac artery.

5 1 , 5

(Fig. 1F).

5

가

가

가

가

가 (5).

,

5

3

가

가

가

가

,

가

,

,

,

가

(4, 5, 12). 5

(6).

5

. 5

, ,

, CT 3

,

(13). CT CT

3 CT

가

CT

. 3 가

.

가

가

가

4 - 8.2%

(4, 5).

1995 Zajko (14) 가 (15, 16), 2 가

가

가

10 mm

12 mm

가

가

3 , CT

1. Bingol H, Cingoz F, Yilmaz AT, Yasar M, Tatar H. Vascular complications related to lumbar disc surgery. *J Neurosurg (spine 3)* 2004;100:249-253
2. Linton RR, White PD. Arteriovenous fistula between the right common iliac artery and the inferior vena cava: report of a case of its occurrence following an operation for a ruptured intervertebral disk with cure by operation. *Arch Surg* 1945;50:6-13
3. Papadoulas S, Konstantinou D, Kourea HP, Kritikos N, Haftouras N, Tsolakis JA. Vascular injury complicating lumbar disc surgery. A systematic review. *Eur J Vasc Endovasc Surg* 2002;24:189-195
4. Jasfer BS, Rich NM. The challenge of arteriovenous fistula formation following disk surgery: a collection review. *J Trauma* 1976;16:726-733
5. Serrano Hernando FJ, Paredero VM, Solis JV, Del Rio A, Lopez Parra JJ, Orgaz A, et al. Iliac arteriovenous fistula as a complication of lumbar disc surgery. Report of two cases and review of literature. *J Cardiovasc Surg* 1986;27:180-184
6. Hildreth DH, Turcke DA. Postlaminectomy arteriovenous fistula. *Surgery* 1977;81:512-520
7. Brewster DC, Cambria RP, Moncure AC, Darling RC, LaMuraglia GM, Geller SC, et al. Aortocaval and iliac arteriovenous fistulas: recognition and treatment. *J Vasc Surg* 1991;13:253-65
8. Quigley TM, Stoney RG. Arteriovenous fistulas following lumbar laminectomy: the anatomy defined. *J Vasc Surg* 1985;2:828-833
9. Smith DW, Lawrence BD. Vascular complications of lumbar decompression laminectomy and foraminotomy. *Spine* 1991;16:387-390
10. Szolar DH, Preidler KW, Steiner H. Vascular complications in lumbar disc surgery: report of four cases. *Neuroradiology* 1996;38:521-525
11. Tsai YD, Yu PC, Lee TC, Chen HS, Wang SH, Kuo YL. Superior rectal artery injury following lumbar disc surgery. Case report. *J Neurosurg (spine 1)* 2001;95:108-110
12. Smith RF, Killen DA. Arteriovenous fistula and chronic congestive heart failure following intervertebral disc surgery. *South Med J* 1973;66:1301-1303
13. Lee KH, Park JH, Chung JW, Han JK, Shin SJ, Kang HS. Vascular complications in lumbar spinal surgery: percutaneous endovascular treatment. *Cardiovasc Intervent Radiol* 2000;23:65-69
14. Zajko AB, Little AF, Steed DL, Curtiss EI. Endovascular stent-graft repair of common iliac artery-to-inferior vena cava fistula. *J Vasc Interv Radiol* 1995;6:803-6
15. Hart JP, Wallis F, Kenny B, O Sullivan B, Burke PE, Grace PA, et al. Endovascular exclusion of iliac artery to iliac vein fistula after lumbar disk surgery. *J Vasc Surg* 2003;37:1091-1093
16. 2 2005;21:156-160

Diagnosis of Arteriovenous Fistulas following a Lumbar Discectomy¹

Byung-Suk Roh, M.D., Mi Young Choi, M.D., Se Jeong Jean, M.D.,
Seong Hoon Park, M.D., Hye Won Kim, M.D., Jeong Ho Kim, M.D.²

¹Department of Radiology, Wonkwang University Hospital

²Department of Radiology, Gachon University, Gil Medical Center

Purpose: To evaluate the relevant clinical and radiographical findings for the diagnosis of an arteriovenous fistula after a lumbar discectomy.

Materials and Methods: Five patients with an arteriovenous fistula following a lumbar discectomy were preoperatively diagnosed and treated. We retrospectively evaluated the level of surgery, injured vessels, clinical symptoms, physical findings, and the interval between surgery and treatment. Effective and fast diagnostic methods for determining the presence of a postoperative arteriovenous fistula were evaluated.

Results: All of the arteriovenous fistulas resulted from operative injuries of the iliac arteries and veins. They were diagnosed after a mean time of 22 months (range 2 months - 4 years) in spite of various symptoms and signs shortly after surgery. The arteriovenous fistulas were confirmed with angiography and were treated by surgery for 3 patients and by insertion of a stent-graft in 2 patients. Postoperative CT angiography showed the complete occlusion of the fistula tract and the normal blood flow.

Conclusion: Essential clinical information and radiological examination, especially CT angiography with 3D reconstruction, is necessary to obtain to diagnose an arteriovenous fistula after a lumbar discectomy.

Index words : Fistula, arteriovenous
Spine, surgery
Computed tomography (CT), angiography
Stents and prostheses

Address reprint requests to : Byung-Suk Roh, M.D., Department of Radiology, Wonkwang University Hospital
344-2, Shinyong-dong, Iksan, Chonbook 570-711, Korea.
Tel. 82-63-859-1922 E-mail: bsroh@wonkwang.ac.kr