

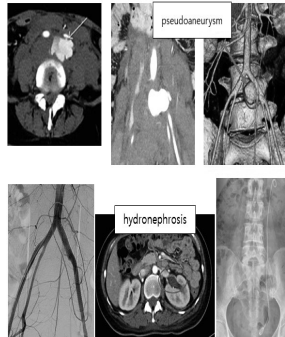
Session IV

# Vascular Complication after Lumbar Stenosis Surgery

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경상의대

## Case I (F/44)

- L4/5 HIVD Lt. → 학회 관계로 새벽에 응급 수술
- Discectomy 도중 Intraoperative brisk bleeding 소견 보였으나 gelform packing 후 바로 지혈이 되어 수술 마치고 나옴
- op. 후부터 V/S stable하나 abdominal pain 을 지속적 으로 호소함.
- Postop. Lab. 상에서 Hb 감소 (11→8.7)



- abdominal CT check;
- Active bleeding at Lt. common iliac artery with about 4cm size pseudoaneurysm. Hemoretroperitoneum

## Case II (F/77)

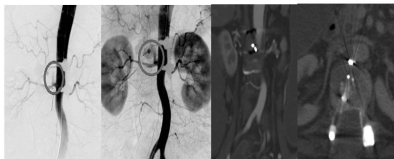
- L1/2 stenosis fusion
- Discectomy 하다가 active, brisk bleeding → untable V/S
- Massive transfusion, Gelform packing 후 지혈됨. V/S stable
  - Hb: 12.4→7.8
  - Pit: 94k→78k→50k



CS call !!!! →그 자리에서 바로 뒤집어 open surgery !!

But, no active bleeding site

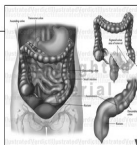
Call interventionist!!!



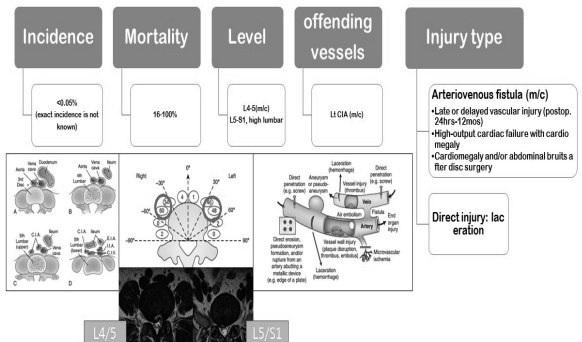
Abdominal aortography에서 right adrenal artery 또는 inferior phrenic artery로 판단되는 vessel에서 contrast extravasation이 관찰되어 microcatheter로 selection 후 microcoils을 이용하여 embolization을 시행함.

- Postop. SICU care
  - Massive transfusion, fluid therapy로 bowel edema 심하여 복부 open site은 oozing
  - PMC with ischemic colitis로 치료

- 퇴원 한달 후 diarrhea, melena, abd. Pain으로 응급실 내원
- Colonoscopy를 하려고 했으나 scope이 진입을 못 할 정도로 심한 stricture 소견 보여서 응급 수술 (hemicolectomy)



## Vascular injury (Jeff Chandler syndrome)



### Risk factors (Solar et al.)

- Preexisting DDD (ant. annular tear)
- Retroperitoneal inflammatory processes leading to adhesions btw vessels & disc
- Aggressive discectomy
- Possibly increased intra-abdominal pressure that may force vessel or viscera against or close to the disc
- Revision discectomy

### Recognition and prompt treatment (intraoperatively) ★

- Brisk bleeding or blood welling up in the disc space
- Intrap. Unexplained hypotension a/w tachycardia
- Abdominal rigidity or palpable mass
- Fat or mucosa in the pithitary rongeur (retroperitoneal adipose tissue, vessel, visceral wall)
- Disc space packing, wound covered with a sterile dressing, volume expander, transfusion
- Vascular surgeon call emergently

should be turned to supine position and abdomen prep/epidural

### Recognition in the recovery room

- Unexplained hypotension
- Tachycardia
- Abdominal sign and symptom
- Pulse change in UE

### To minimize the risk during lumbar discectomy

- Adequate illumination & magnification
- Limited or subtotal discectomy
- Only loose disc fragments should be removed

**pithitary rongeur**  
primary instrument of destruction (Freeman)

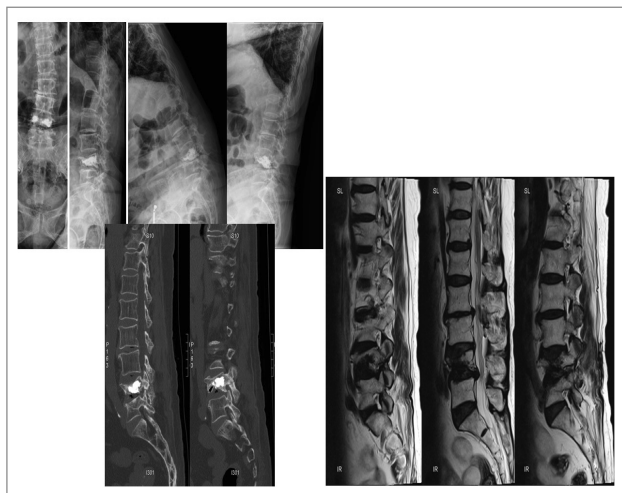
- Recommendation ranging from 2.5-4.5
- inserted until direct vision and limited to 2.5cm in most cases
- However, there is no clear consensus as to the safe depth of penetration
- Horschler et al.
- 2.5-3.75 cm below post. margin of VB at L2-3 through L4-5
- Not more than 4 cm at L5-S1

### case III (F77)

- C/C: intractable, severe back pain  
Lt. > Rt. Buttock, lateral thigh, posterolateral calf pain
- P/I
  - 내원 1년 전부터 요통, 양하지통이 있어 지속적으로 물리치료, 침 맞고 지내시다가 점차 증상이 악화되고 보행 힘들어 내원
- NIC: 20-30 m
- PMHx
  - pulmonary thromboembolism (PTE)
    - 2011. 12. Dx (both main, lobar & segmental pul. Artery)
    - 2012. 1. Lt calf vein DVT Dx
      - 이후 지속적으로 warfarin stop
    - 2013. 12. recurred PTE (both main, lobar & segmental pul. Artery) and DVT (Lt popliteal vein)
      - restart anticoagulants (warfarin)

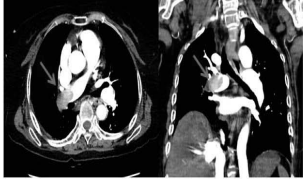
- In spite of conservative Mx for 3 months,
  - Pain increased gradually
  - Analgesics → opioid
    - Fentanyl patch 25mg
    - Ircodon 5mg TID
    - NSAIDs
  - L4,5 root block : not effective
  - Sincerely wants to undergo a surgical treatment

“아파서 죽고 싶어요.  
죽든 살든 수술해 주세요”

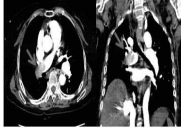



- Pre-op. treatment
  - Consult department of internal medicine, division of pulmonology
  - after discontinuing warfarin and administrating of a short-acting anticoagulants.
  - Neural decompression, Interbody fusion & PSF


- POD #3D
  - Abd. & chest discomfort
  - Sz. like behavior
  - SBP 60 mmHg, SaO2 60%, semicomatous mentation
    - intubation, C-line, inotropic agents....
  - EKG : sinus tachycardia
  - Taken chest CT



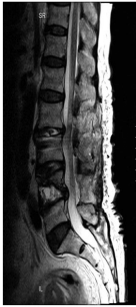
- T/F to ICU
- Cardiac arrest → cardiopulmonary resuscitation, nearly an hour
- Call thoracic surgery !!
  - Extracorporeal membrane oxygenation (ECMO)
- Catheter thrombectomy
- Direct fibrinolysis
  - Via pulm. a. cath.
  - Urokinase continuously

- POD #5D
  - Vital stabilization
  - Mental : alert
  - F/U chest CT
- ECMO weaning
- Ventilator weaning – frail chest d/t rib Fx.



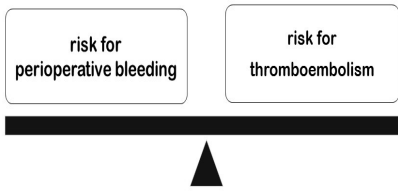
- POD #7D
  - Extubation
  - ECMO cath. Remove
  - Spine H-vac drainage amount <30cc/D → remove
- POD #10D
  - Foot drop, Rt.
    - OP site hematoma ?
    - common peroneal n. palsy ?



The question of whether anticoagulant agent should be suspended in patient who will undergoing a surgery

risk for  
perioperative bleeding

risk for  
thromboembolism



## Risk stratification of thromboembolism

**CHEST** CHEST 2012, 141(2):Suppl:1-59R Supplement  
ANTITHROMBOTIC THERAPY AND PREVENTION OF THROMBOSIS, PHLEBITIS/ALP GUIDELINES

**Perioperative Management of Antithrombotic Therapy**  
Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

James D. Douvan, MD, FCCP; Dale C. Springer, MD, FCCP; Frederick A. Spencer, MD; Michael May, MD, Anir K. Joffe, MD, FCCP; Mark H. Eckman, MD; Andrew S. Chan, MD and Eugene Racz, MD, MS, (pt)

Risk Status	Indications for VTE Therapy		
	Mechanical Heart Valve	Atrial Fibrillation	VTE
High	<ul style="list-style-type: none"> <li>• In a mitral valve prosthesis</li> <li>• In a cuspid/aortic or tilting-disc aortic valve prosthesis</li> <li>• Bicuspid (within 6 mo) stroke or transient ischemic attack</li> </ul>	<ul style="list-style-type: none"> <li>• CHADS<sub>2</sub> score of 5 or 6</li> <li>• Bicuspid (within 3 mo) stroke or transient ischemic attack</li> <li>• Bicuspid or valvular heart disease</li> </ul>	<ul style="list-style-type: none"> <li>• Bicuspid (within 3 mo) VTE</li> <li>• Severe thrombophilia (eg, deficiency of protein C, protein S, or antithrombin; antiphospholipid antibodies, multiple abnormalities)</li> </ul>
Moderate	<ul style="list-style-type: none"> <li>• Bicuspid aortic valve prosthesis and one or more of the following risk factors: atrial fibrillation, prior stroke or transient ischemic attack, hypertension, diabetes, congestive heart failure, age &gt;75y</li> </ul>	<ul style="list-style-type: none"> <li>• CHADS<sub>2</sub> score of 3 or 4</li> </ul>	<ul style="list-style-type: none"> <li>• VTE within the past 3-12 mo</li> <li>• Nonsevere thrombophilia (eg, heterozygous factor V Leiden or prothrombin gene mutation)</li> <li>• Recurrent VTE</li> <li>• Active cancer (treated within 6 mo or palliative)</li> </ul>
Low	<ul style="list-style-type: none"> <li>• Bicuspid aortic valve prosthesis without atrial fibrillation and no other risk factors for stroke</li> </ul>	<ul style="list-style-type: none"> <li>• CHADS<sub>2</sub> score of 0 to 2 (assuming no prior stroke or transient ischemic attack)</li> </ul>	<ul style="list-style-type: none"> <li>• VTE &gt;12 mo previous and no other risk factors</li> </ul>

The NEW ENGLAND JOURNAL of MEDICINE  
N. ENGL. J. MED. 368:22 NEW ORC. MAY 20, 2013

REVIEW ARTICLE

CURRENT CONCEPTS

### Management of Antithrombotic Therapy in Patients Undergoing Invasive Procedures

Todd H. Baron, M.D., Patrick S. Kamath

**Table 2. Risk Factors for Thromboembolic Events in Patients with a Mechanical Heart Valve or History of Venous Thromboembolism.**

Patient History	Low Annual Risk	Moderate Annual Risk	High Annual Risk
Mechanical heart valve	Bileaflet aortic-valve prosthesis without atrial fibrillation, prior stroke or thromboembolic event, or known intracardiac thrombus	Bileaflet aortic-valve prosthesis and atrial fibrillation	Any mitral-valve prosthesis, any caged-ball or tilting-disk aortic-valve prosthesis, multiple mechanical heart valves, or stroke, TIA, or cardioembolic event
Venous thromboembolism	Venous thromboembolism >12 mo previously and no other risk factor (e.g., provoked and transient)	Venous thromboembolism within previous 3-12 mo, nonrecurrent thrombophilia, or recurrent venous thromboembolism	Venous thromboembolism within previous 3 mo, severe thrombophilia, unprovoked venous thromboembolism, or active cancer (cancer diagnosed <6 mo or patient undergoing cancer therapy)
Annual risk for thromboembolism	5%	5~ 10%	> 10%

## Perioperative anticoagulant protocols

**Interruption of anticoagulant agents before surgery**

**Bridging anticoagulation**

- Administration of a short-acting anticoagulant
- SC low molecular weight heparin (LMWH)
- IV unfractionated heparin (UFH)
- During interruption of warfarin when the INR is not within a therapeutic range

**Resumption of anticoagulant agents after surgery**