

## BÖLÜM 54

# MINİMAL İNVAZİV YAKLAŞIMLARIN SEÇİMİ: RİSKLER VE KOMPLİKASYONLAR



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### GİRİŞ

Minimal invaziv omurga cerrahisinin amacı, hastanın anatomisine minimum hasar vererek ve oluşacak morbiditeyi en aza indirgeyerek açık cerrahi yaklaşımlara eşit veya daha üstün sonuçlar elde etmektir (1). Mikroskoplar ve tübüler retractor sistemleri minimal invaziv omurga cerrahisinin temel elemanları olmakla birlikte, bu sistemin geleneksel yöntemlere göre avantaj ve dezavantajları bu bölümde tartışılacaktır.

Cerrahların küçük bir kesi üzerinden hastaya müdahale etmesi deneyim gerektirmektedir ve cerrahların mikroskop üzerinden gördükleri iki boyutlu alanı, kendi zihinlerinde üç boyutlu şekilde algılayabilmeleri önemlidir (2). Tübüler retractor cihazlarının uzunluğuna ve dokunsal olarak geri bildirimlerine uyum sağlamaları önemlidir. Cerrah minimal invaziv alanda çıkacak komplikasyonlarla baş edebilmeli ve komplikasyonların yönetimini iyi yapabilmelidir. Floreskopi, disk alanı hazırlığı başta olmak üzere sıklıkla kullanıldığından, hastaya ve cerraha radyasyon dozu maruziyeti açık spinal cerrahiye oranla iki kat artmış olarak bulunmuştur (3). Minimal invaziv cerrahi yaklaşımlar teknik olarak zor ve öğrenme eğrisi uzun prosedürlerdir.

### 1.Servikal Vertebra Cerrahi Yaklaşım Komplikasyonları

#### *Anterior Cerrahi Yaklaşım Komplikasyonları*

Açık anterior yaklaşımla yapılan cerrahilerde görülen komplikasyonların hepsi minimal invaziv yaklaşımda da karşımıza çıkmaktadır.

Özefagus yaralanması, trakea yaralanması, karotis veya vertebral arter yaralanması, yutma güçlüğü ve disfoni bu komplikasyonların en önemlileridir. Laringeal rekürren sinir, direkt travma, nöropraksi, azalmış kapiller akıma bağlı iskemi ve longus kolli kası üzerine retractor basısı sonucu felce uğrayabilir. Anatomik olarak sol taraflı anterior yaklaşım sinirin seyri göz önüne alındığında yaralanma açısından daha avantajlı gibi görünse de iki taraflı yaklaşım arasında sinir hasarı açısından fark olmadığını belirten yayınlar da bulunmaktadır (4).

Özefageal yaralanma direkt travmaya veya aşırı retraksiyona bağlı olarak ortaya çıkabilir ve anlaşılmadığı takdirde mediastinit, pnömoni, prevertebral veya retrofaringeal abse, trakeoözefageal fistül gibi yaşamı tehdit eden komplikasyonlara yol açar.

Karotis arteri veya vertebral arter anterior yaklaşımla daha seyrek olarak yaralanmakla

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## KAYNAKÇA

- Mosenthal WP, Divi SN, Dickherber JL, Lee MJ (2019). Choice of Minimally Invasive Approaches: A Review of Unique Risks and Complications. In F.M. Philips, I.H. Lieberman, D.W. Polly Jr, M.Y. Wang (eds.), *Minimally Invasive Spine Surgery* (pp. 639-52). New York: Springer
- Park Y, Ha JW. Comparison of one-level posterior lumbar interbody fusion performed with a minimally invasive approach or a traditional open approach. *Spine*. 2007;32(5):537-43.
- Wong AP, Smith ZA, Stadler JA, et al. Minimally invasive transforaminal lumbar interbody fusion (MI-TLIF): surgical technique, long-term 4-year prospective outcomes, and complications compared with an open TLIF cohort. *Neurosurgery Clinics*. 2014;25(2):279-304.
- Tan TP, Govindarajulu AP, Massicotte EM, et al. Vocal cord palsy after anterior cervical spine surgery: a qualitative systematic review. *The Spine Journal*. 2014;14(7):1332-42.
- Jho HD. Microsurgical anterior cervical foraminotomy for radiculopathy: a new approach to cervical disc herniation. *Journal of neurosurgery*. 1996;84(2):155-60.
- Kotil K, Bilge T. Prospective study of anterior cervical microforaminotomy for cervical radiculopathy. *Journal of Clinical Neuroscience*. 2008;15(7):749-56.
- Park YK, Moon HJ, Kwon TH, et al. Long-term outcomes following anterior foraminotomy for one-or two-level cervical radiculopathy. *European Spine Journal*. 2013;22(7):1489-96.
- Tzaan WC. Anterior percutaneous endoscopic cervical discectomy for cervical intervertebral disc herniation: outcome, complications, and technique. *Clinical Spine Surgery*. 2011;24(7):421-31.
- Lee JH, Lee S-H. Clinical and radiographic changes after percutaneous endoscopic cervical discectomy: a long-term follow-up. *Photomedicine and laser surgery*. 2014;32(12):663-8.
- Yao N, Wang C, Wang W, et al. Full-endoscopic technique for anterior cervical discectomy and interbody fusion: 5-year follow-up results of 67 cases. *European Spine Journal*. 2011;20(6):899-904.
- Celestre PC, Pazmiño PR, Mikhael MM, et al. Minimally invasive approaches to the cervical spine. *Orthopedic Clinics*. 2012;43(1):137-47.
- Song Z, Zhang Z, Hao J, et al. Microsurgery or open cervical foraminotomy for cervical radiculopathy? A systematic review. *International orthopaedics*. 2016;40(6):1335-43.
- McAnany SJ, Kim JS, Overley SC. A meta-analysis of cervical foraminotomy: open versus minimally-invasive techniques. *The Spine Journal*. 2015;15(5):849-56.
- Terai H, Suzuki A, Toyoda H, et al. Tandem keyhole foraminotomy in the treatment of cervical radiculopathy: retrospective review of 35 cases. *Journal of Orthopaedic Surgery and Research*. 2014;9(1):38.
- Fessler RG, Khoo LT. Minimally invasive cervical microendoscopic foraminotomy: an initial clinical experience. *Neurosurgery*. 2002;51(suppl\_2):S2-37-S2-45.
- Skovrlj B, Gologorsky Y, Haque R. Complications, outcomes, and need for fusion after minimally invasive posterior cervical foraminotomy and microdiscectomy. *The Spine Journal*. 2014;14(10):2405-11.
- Bydon M, Macki M, Kaloostian P, et al. Incidence and prognostic factors of c5 palsy: a clinical study of 1001 cases and review of the literature. *Neurosurgery*. 2014;74(6):595-605.
- Kim MK, Cho SM, You SH, et al. Hybrid Technique for Cervical Pedicle Screw Placement: Combination of Miniopen Surgery and Use of a Percutaneous Cannula System—Pilot Study. *Spine*. 2015;40(15):1181-6.
- Kantelhardt SR, Keric N, Conrad J, et al. Minimally invasive instrumentation of uncomplicated cervical fractures. *European Spine Journal*. 2016;25(1):127-33.
- Wang MY, Levi AD. Minimally invasive lateral mass screw fixation in the cervical spine: initial clinical experience with long-term follow-up. *Neurosurgery*. 2006;58(5):907-12.
- Arts MP, Bartels RH. Anterior or posterior approach of thoracic disc herniation? A comparative cohort of mini-transsthoracic versus transpedicular discectomies. *The Spine Journal*. 2014;14(8):1654-62.
- Yoshihara H. Surgical treatment for thoracic disc herniation: an update. *Spine*. 2014;39(6):E406-E12.
- Faciszewski T, Winter RB, Lonstein JE, et al. The surgical and medical perioperative complications of anterior spinal fusion surgery in the thoracic and lumbar spine in adults. A review of 1223 procedures. *Spine*. 1995;20(14):1592-9.
- Deviren V, Kuelling FA, Poulter G, et al. Minimal invasive anterolateral transthoracic transpleural approach: a novel technique for thoracic disc herniation. A review of the literature, description of a new surgical technique and experience with first 12 consecutive patients. *Clinical Spine Surgery*. 2011;24(5):E40-E8.
- Kasliwal M, Deutsch H. Minimally invasive retropleural approach for central thoracic disc herniation. *min-Minimally Invasive Neurosurgery*. 2011;54(04):167-71.
- Elhadi AM, Zehri AH, Zaidi HA, et al. Surgical efficacy of minimally invasive thoracic discectomy. *Journal of Clinical Neuroscience*. 2015;22(11):1708-13.
- Burke TG, Caputy AJ. Treatment of thoracic disc herniation: evolution toward the minimally invasive thoracoscopic technique. *Neurosurgical focus*. 2000;9(4):1-7.
- Cheung K, Ghazi SA. Approach-related complications of open versus thoracoscopic anterior exposures of the thoracic spine. *Journal of Orthopaedic Surgery*. 2008;16(3):343-7.
- Lee CY, Wu MH, Li YY, et al. Video-assisted thoracoscopic surgery and minimal access spinal surgery compared in anterior thoracic or thoracolumbar junctional spinal reconstruction: a case-control study and review of the literature. *BioMed research international*. 2016;2016.

30. Bransford RJ, Zhang F, Bellabarba C, et al. Treating thoracic-disc herniations: do we always have to go anteriorly? *Evidence-based spine-care journal*. 2010;1(1):21.
31. Chou D, Lu DC. Mini-open transpedicular corpectomies with expandable cage reconstruction. *Journal of Neurosurgery: Spine*. 2011;14(1):71-7.
32. Chi JH, Dhall SS, Kanter AS, et al. The Mini-Open transpedicular thoracic discectomy: surgical technique and assessment. *Neurosurgical Focus*. 2008;25(2):E5.
33. Regev GJ, Salame K, Behrbalk E, et al. Minimally invasive transforaminal, thoracic microscopic discectomy: technical report and preliminary results and complications. *The Spine Journal*. 2012;12(7):570-6.
34. Shriver MF, Xie JJ, Tye EY, et al. Lumbar microdiscectomy complication rates: a systematic review and meta-analysis. *Neurosurgical focus*. 2015;39(4):E6.
35. Zhang Q, Yuan Z, Zhou M, et al. A comparison of posterior lumbar interbody fusion and transforaminal lumbar interbody fusion: a literature review and meta-analysis. *BMC musculoskeletal disorders*. 2014;15(1):367.
36. Wong AP, Smith ZA, Nixon AT, et al. Intraoperative and perioperative complications in minimally invasive transforaminal lumbar interbody fusion: a review of 513 patients. *Journal of Neurosurgery: Spine*. 2015;22(5):487-95.
37. Ozgur BM, Aryan HE, Pimenta L, et al. Extreme Lateral Interbody Fusion (XLIF): a novel surgical technique for anterior lumbar interbody fusion. *The Spine Journal*. 2006;6(4):435-43.
38. Tubbs RI, Gabel B, Jeyamohan S, et al. Relationship of the lumbar plexus branches to the lumbar spine: anatomical study with application to lateral approaches. *The Spine Journal*. 2017;17(7):1012-6.
39. Moller DJ, Slimack NP, Acosta FL, et al. Minimally invasive lateral lumbar interbody fusion and transspinal approach-related morbidity. *Neurosurgical focus*. 2011;31(4):E4.
40. Tohmeh AG, Rodgers WB, Peterson MD. Dynamically evoked, discrete-threshold electromyography in the extreme lateral interbody fusion approach. *Journal of Neurosurgery: Spine*. 2011;14(1):31-7.
41. Mayer HM, Wiechert K. Microsurgical anterior approaches to the lumbar spine for interbody fusion and total disc replacement. *Neurosurgery*. 2002;51(suppl\_2):S2-159-S2-65.
42. Silvestre C, Mac Thiong JM, Hilmi R, et al. Complications and morbidities of mini-open anterior retroperitoneal lumbar interbody fusion: oblique lumbar interbody fusion in 179 patients. *Asian Spine Journal*. 2012;6(2):89.
43. Abe K, Orita S, Mannoji C, et al. Perioperative complications in 155 patients who underwent oblique lateral interbody fusion surgery: perspectives and indications from a retrospective, multicenter survey. *Spine*. 2017;42(1):55-62.
44. Fujibayashi S, Kawakami N, Asazuma T, et al. Complications associated with lateral interbody fusion: nationwide survey of 2998 cases during the first 2 years of its use in Japan. *Spine*. 2017;42(19):1478-84.
45. Hynes RA, Woods KR, Yu A, et al. The oblique lumbar interbody fusion (OLIF), including the L5/S1 level: early postoperative safety profile in a multicenter review. *The Spine Journal*. 2018;18(8):S98-S9.
46. Lindley EM, McCullough MA, Burger EL, et al. Complications of axial lumbar interbody fusion. *Journal of Neurosurgery: Spine*. 2011;15(3):273-9.
47. Gundanna MI, Miller LE, Block JE. Complications with axial presacral lumbar interbody fusion: A 5-year postmarketing surveillance experience. *SAS journal*. 2011;5(3):90-4.