Background: Lateral lumbar trans-psoas interbody fusion has been proposed to be less invasive than anterior lumbar interbody fusion (ALIF) and to offer improved fusion and improved restoration of interbody height and segmental alignment compared to posterior interbody fusion techniques (PLIF, TLIF). Lateral trans-psoas fusion has recently been used to treat deformities including degenerative scoliosis and isthmic spondylolisthesis.

Study design and methods: This retrospective review examined preoperative and postoperative characteristics of twenty-seven consecutive adult patients who underwent deformity correction using trans-psoas interbody fusion. All patients were treated by a single surgeon at a single medical center in the US. Multi-modal intra-operative neuromonitoring was performed, with multiple quadriceps leads, and scrotal leads used in males. The retroperitoneal approach was performed under direct visualization, using modified hand held retractors to visualize the psoas muscle. The psoas was traversed under direct vision and with fluoroscopic guidance using sequential dilators. Gentle deformity correction was accommodated by wide bilateral release of the annulus as well as by application of large interbody implants (range 11mm to 18mm height, 40 to 60 mm width), extending over the lateral aspect of the ring apophysis and lateral vertebral body. Staged posterior instrumented fusion was performed with or without decompression. Hospital charts and operative data were retrospectively reviewed to determine the number of levels operated, average blood loss, complications, post-operative time to independent ambulation, and time to discharge from hospital.

Results: Fifteen patients had fusion at one level while nine patients had fusion at two levels and three patients had fusion at three levels. Average blood loss for lateral interbody fusion was 20cc and average blood loss for posterior procedure was 310cc. All patients were able to ambulate on the first post-operative day. Average hospital stay was five days. The most frequent complication (5/27 patients, 18%) was transient unilateral iliopsoas weakness on the approach side, which improved by the first (2 week) postoperative visit. Transient anterior thigh numbness on the approach side was also frequently observed (6/27 patients, 22%). Transient numbness along L3 distribution was seen in one patient who recovered uneventfully. Ureteral injury was seen in one patient who was treated with percutaneous nephrostomy and healed without further consequences.

Conclusions: It has been proposed that lateral trans-psoas interbody fusion may offer improved safety and efficacy for lumbar deformity treatment, as compared to ALIF, PLIF, or TLIF. The lateral interbody fusion can be safely applied to deformities if certain technique modifications are followed. Careful attention to these modifications will be required in order to best compare lateral interbody fusion to the established alternatives in future large clinical trials.