

XLIF MISS Literature Review

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Abstract

The interest to decrease the complications and morbidity in patients, encourage the investigation to search for minor invasive surgical techniques. The medical responsibility for the wellness of the patient adds to the actual advanced technologies that is the origin to propose more efficient interventions. An example is the XLIF (extreme lateral interbody fusion) represents one of the avant-gard techniques of spine surgery. The XLIF represents an excellent option for the treatment of some spine complex pathologies that needs decompression, balance alignment, arthrodesis and stabilization: degenerative disc disease, spondylolisthesis grade I and II, deformities like degenerative scoliosis or adjacent disc disease are examples where the benefit of this technique is evident. The XLIF represents an excellent option for the treatment of some spine complex pathologies that needs decompression, balance alignment, arthrodesis and stabilization: degenerative disc disease, spondylolisthesis grade I and II, deformities like degenerative scoliosis or adjacent disc disease are examples where the benefit of this technique is evident. However, this method is contraindicated for L5-S1 (limited by iliac crest) disc disease or spondylolisthesis grade III for example. [15]

Introduction:

The interest to decrease the complications and morbidity in patients, encourage the investigation to search for minor invasive surgical techniques. The medical responsibility for the wellness of the patient adds to the actual advanced technologies that is the origin to propose more efficient interventions. An example is the XLIF (extreme lateral interbody fusion) represents one of the avant-gard techniques of spine surgery. Developed by Luiz Pimenta in 2001 [1], this procedure offers the advantage to log into the lateral face of the lumbar spine through small incisions that will avoid a damage in the paraspinal muscles. Obtained results are similar compared with the traditional techniques (intersomatic fusion). A similar endoscopic retroperitoneal technique was used at the beginning without the expected success [11].

The XLIF represents an excellent option for the treatment of some spine complex pathologies that needs decompression, balance alignment, arthrodesis and stabilization: degenerative disc disease, spondylolisthesis grade I and II, deformities like degenerative scoliosis or adjacent disc disease are examples where the benefit of this technique is evident.

However, this method is contraindicated for L5-S1 (limited by iliac crest) disc disease or spondylolisthesis grade III for example. [15]

Objective:

The aim of the present work is to expose the achievements of the application of this procedure, to explain some of the elemental features that this method needs and show the benefits that the technique offers. Likewise, the results like fusion rate, surgery time, bleeding and in-hospital stay needs to analyze.

Material and Method:

There are 5 basic principles of this technique that we need to keep in mind: The "perfect lateral" position of the patient (Figure 1), the gentle retroperitoneal dissection, the way through the psoas with neurophysiological monitoring, the complete resection of the disc with contralateral decompression of the annulus (Figure III) and the appropriate size of the implant. It's imperative the anatomic knowledge of the trans-psoas lateral extremity access, learn the relations of the muscular, visceral, vascular and nervous structures. The knowledge of these facts, decrease the surgical risks.



Figure 1 & 2: The “perfect lateral” position of the patient

It is essential for the procedure to recognize the muscular anatomy for a secure intervention. For learning purposes and a better understanding, it discriminates a superficial level and deep level. The superficial level is composed by external oblique, internal oblique and transversal oblique.

Takamoto Moro and collaborators [10], performed an anatomic study in corpses with the goal to recognize the safety areas of the lumbar plexus regarding the Psoas. They concluded that this safety area is above of L2-L3. Right genitofemoral nerve has a path among the area II, left genitofemoral nerve has a path among number III, while the others nervous branches are in the number IV. In the flow rates levels the safety areas decrease.

Wan-Kun Hu, et al. [8] identified the relation among the Psoas with the great vessels. They place the vena cava in the area I toward the right flank. To the left, the aorta's path is front at the area I. Are established as safety areas, for the levels L1-L2, L2-L3, both in left flank and right flank, the area II and III. For the levels L3-L4 the safety area is the number II. In the level L4-L5 the safety area is number I for the left flank and the number I for the right flank.

It is important to know that this study shows static structures, because this technique was performed in cadavers. It is necessary to be aware of the changes than the different positions of the patients among the retroperitoneal structures. Armen R., et al. [14] performed a study where they evaluated, through magnetic resonance, the movements of the abdominal structures regarding the position. The investigation includes the right lateral decubitus and the left lateral decubitus; it proved that the aorta and the cava are located in a posterior flat at level L3-L4 and the kidneys are in caudal situation.

The deep level conforms by psoas major and quadratus lumborum. The lumbar plexus is composed by the branches L1 to L4, they conform a retroperitoneal structure and the fibers cross among Psoas. It is required to avoid lesions to know the exact location of these structures. [2]

To recognize the safety areas described in the literature are fundamental for avoid injuries of the lumbar plexus and vascular structures. Likewise, neurophysiology monitoring is essential to avoid lesions. Bergey and collaborators [4] reported a rate of elevated complications compared with the procedures than used the monitoring adequately [5]. The electromyography constitutes the most appropriate monitoring, because the visualization of the lumbar plexus is complicated even though in open techniques. The real time monitoring gives a possibility to keep safe the lumbar plexus, every time that it let us recognize indirectly. It is worth to mention that there are specific anesthetics to make adequately the electrophysiology monitoring; the muscle relaxants should be avoided and removed by the patient's metabolism when the monitoring started to avoid misunderstanding of the electrical impulse transmission lecture.

Results:

The results showed for different authors make evident a fusion rate for this procedure of 91%. Reported by Ozgur et al. - of 100% reported by Dakwar et al. - The surgical time oscillates from 67 minutes - Oliveira et al. - to 477 minutes - Wang et al. -. The amount of bleeding presented by patients oscillates from 50 ml - Oliveira, et al. - to 600 ml - Knight, et al. -. The complications oscillate from 2% - Rodgers, et al. - to 75% - Tormenti and collaborators. The in-hospital stay reports a minimum of 12 hours - Oliveira, et al. - to maximum of 5 days - Knight, et al. -. With an improvement of the analogous visual scale until 80% - Rodger, et al.

Surgeon	Fusion %	Bleeding	Surgical time (min)	Complications	Reoperations	IHS	VAS
Oliveira		50 ml	67 minutes	6.7%	13.3%	12-48 hours	
Rodgers 2007 (First 100 patients)				2%		1.5 days	68.7%
Ozgur	91%			19%	1.6%		
Dakwar	100%	53 ml	108 minutes	20%			70.4%
Wang	100%	401 ml	477 minutes	30.4%	4.3%		
Knight		25-600 ml	161 minutes	22%	1.7%	5 days	
Rodgers 2009 (Enf. Disco adyacente)				9%	2	1.13 days	67.4%
Anand 2008							32.4%
Rodgers 2010 (300 patients)	97%				1.3%		80%
Anad 2010							57%
Tormenti				75%			
Rodgers (600 patients)				6.2%			

Among the advantages it presents this technique are of biomechanics considerations. The removal of many intervertebral disk makes possible the placement of large implants. That provides a greater exposure surface form the implant to the platforms advantaged major fusion rates. This technique preserves anterior and posterior osteoligamentary structures that a substantial stability of the segment, sagittal and coronal correction coronal [6,7]. Vamivani, et al. Remark a increase of 33% in the canal amplitude and a 41% in the foramen area product of the increase of the interdiscal space. Indirectly this technique auspicious the descompression of the neural elements [8].

There are four possibilities to contribute to the fusion process: the called stand-alone lateral plaque, unilateral transpedicular instrumentation or bilateral transpedicular instrumentation. Several studies analyzed this possibilities, however the results do not have statistical soundness since they have been carried out in non-homogeneous conditions. It is necessary a cautious analysis and new studies to provide truthful information. At the moment, research shows that bilateral instrumentation provides greater stiffness and biomechanical stability [7,9].

Conclusion:

Therefore, this technique provide notables advantages than other procedures as long as you have the precise comprehension of the anatomic and essentially the lumbar plexus. It is necessary to know the methods that better adjust to the patient accommodation to established an adequate management of the neurophysiological monitoring and to know specific criteria of the preventive care. Although, even in experience hands there

are morbidity, that is the reason it is very important to know exactly the aspects of this procedure to accomplish with optimum results and secure.

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