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# Intraregional differences of perioperative management strategy for lumbar disc herniation: is the Devil really in the details?

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## Abstract

### Background

This study intends to evaluate whether regional common habits or differences in case-volume between surgeons are significant variables in the perioperative management of patients undergoing surgery for lumbar disc herniation.

### Methods

An e-mail survey was sent to all neurosurgeons working in Lombardy, Italy's most populated region. The survey consisted of 17 questions about the perioperative management of lumbar disc herniation.

### Results

Forty-seven percent (47%) out of 206 Lombard neurosurgeons answered the survey. Although in some respects there is clear evidence in current literature on which is the best practice to adopt for an optimal management strategy, we noticed substantial differences between respondents, not only between hospitals but also between surgeons from the same hospital. Still, no differences were evident in a high vs low case-volume comparison.

### Conclusion

We identified no regional clusterization as for practical principles in the perioperative management of lumbar disc herniation and neither was case-volume a significant variable. Other causes may be relevant in the variability between the perioperative management and the outcomes achieved by different specialists.

LUMBAR SPINE

KEYWORDS: LUMBAR DISC HERNIATION, DISCECTOMY, SCIATICA, SURGERY

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## Introduction

Lumbar disc herniation (LDH) is one of the most common pathologies affecting the adult population. The prevalence of symptomatic LDH is about 2%: it has been estimated that up to 70% of male subjects will have symptoms related to this pathology at least once in a lifetime.<sup>1</sup> The first-line therapy for LDH is usually conservative, consisting of a combination of rest and/or physical therapy, anti-inflammatory drugs (such as NSAIDs and steroids), muscle relaxants, pain killers and antiepileptic drugs. Surgical therapy is usually indicated when there is a story of low-back pain and/or sciatalgia, associated with positive imaging for LDH and neurological deficits after a conservative treatment failure. Most of these princi-

ples are accepted by the majority of neurosurgeons, while the perioperative management of this pathology varies considerably. Several features regarding the perioperative management of lumbar disc herniation have been studied in literature with different evidence levels but there is not a practical agreement on many aspects in the global scientific community. Aim of this study is to verify whether there is some agreement, at least at a regional level, and if case-volume is a factor in determining perioperative habits of care. On this purpose we conducted a survey among neurosurgeons operating in Lombardy, Italy's most populated region, with an estimated population of around 10 million people. This choice was made on the assumption that such a survey could represent a regional sample which turns out to be sufficiently

large and homogenous since all the respondents have the same specialization and practice in the same area.

## Materials and Methods

We located all the fully trained neurological surgeons working in Lombardy in its 22 neurosurgical departments. These last span from relatively small private Hospital settings to large University Hospitals A survey consisting of the following questions was sent to each of them by an e-mail with a link redirecting to a Google Form page which was available on line from September to November 2014:

How many LDH do you operate per year?

Which kind of anesthesia do you use?

Which surgical position do you use?

Do you use a fluoroscope?

Which kind of retractor do you use?

Do you use a microscope or surgical loupes?

Do you inject local anesthetics?

Do you inject glucocorticoids (GCs) periradicularly?

When do you mobilize patients?

In case of unintentional durotomy, do you prolong medical cares?

When do you usually discharge patients?

Do you prescribe a corset during the postoperative period? For how long do you recommend it?

Do you prescribe GCs during the postoperative period?

Do you prescribe opioids and/or NSAIDs during the postoperative period?

Do you prescribe neurotrophic drugs during the postoperative period?

Do you prescribe physiotherapy?

Do you schedule a follow-up visit?

## Statistical Methods

In order to detect any differences between the treatment strategies of high vs low volume surgeon (>50 vs <50 LDHs operation per year) we performed Chi-square tests, accepting  $p < 0.05$  for statistical significance.

## Results

Ninety-seven (47%) out of the 206 questionnaires were completed by Lombard neurosurgeons. The majority of surgeons operate 20 to 100 LDHs each year: 51.5% and 28.9% of surgeons perform 20 to 50 and 50 to 100 operations each year respectively; 18.6% of surgeons make less than 20 operations each year, 1 surgeon reported more than 100 LDHs in a year. The most relevant variables considered are presented in Table 1.

The vast majority of surgeons (90.7%) operate with general anesthesia. Roughly half of the responders (56.7%) use a surgical positioning frame to enhance lumbar kyphosis (e.g. Wilson frame); 35.1% and 8.2% of surgeons prefer a Knee-Chest position or a simple prone position with pillows, respectively. Caspar, Taylor and Williams retractor systems are used as for frequency of employment (68.0%, 20.6%, 11.4%). The vast majority of the surgeons (82.5%) use a microscope or surgical loupes during the operations. 90.7% of surgeons use the fluoroscope. 68% of surgeons use local anesthetics: 66.7% pre-operatively only, 27.3% at the end of intervention and 6% both pre-operatively and at the end of intervention. 23.7% inject periradicular GCs. Considering the post-operative period, only 23.7% of surgeons start mobilizing patients on the same day of the operation, whereas others prefer to wait for the following day. 24.7% of surgeons recommend the use of an orthopedic corset: among them 75% prefer a lumbar elastic band whereas a 25% prefer a rigid corset. Corsets are prescribed for 15 days by 48.4% of surgeons, 1 month by 29%, over 1 month by 22.6%. The patient is usually discharged during the 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> (or more) day after the operation by 25.8%, 66.0% and 8.2% surgeons respectively. When

an unintended durotomy occurs, 59.8% of surgeons prolong hospitalization for 1 day, 14.4% for 2 days or more, and 25.8% do not prolong patient hospitalization. GCs, opioids and/or NSAIDs and neurotrophic medications are routinely prescribed by 46.4%, 7.2% and 11.3% of surgeons respectively. Physiotherapy is prescribed only by roughly half of the surgeons: 12.2% recommend its beginning 15 days post surgery, 87.8% after 1 month. Patients are routinely seen in outpatient clinics for the follow-up: 65.0% 1 month after the operation; 10.3% after 3 months, 24.7% only at patients' request. From a comparison between the results yielded by high case-volume surgeons (i.e  $\geq 50$  LDH intervention per year) and those with a low-

case volume, we gathered that there were no statistically significant differences for any of the items of the questionnaire.

## Discussion

A review of literature was performed searching the reported guidelines on management of low back pain and sciatica for perioperative management recommendations.<sup>2-5</sup> Little to no information is available on this particular topic. In particular a general lack of an evidence-based approach is noticeable. Also in the largest international case series, when reported, the subtle nuances of perioperative management seems to be determined by surgeons' comfort and common habit. Indeed, although LDH is one of the most common pathologies in the neurosurgical practice, there are still many non-common routines among neurosurgeons: surprisingly, in accordance to the global literature, also the results of our regional survey showed that there is not a standard perioperative treatment routine. In particular, we did retrieve different answers from practitioners of the same hospital and we could not detect any specific trend related to the personal, yearly case-volume. Even when there is a clear evidence or, at least, an indication in literature on the best treatment strategy, there wasn't always a common practice by the majority of surgeons. Specifically, as early as the first clinical question, even though a recent review<sup>6</sup> showed the benefits of loco-regional anesthesia compared to general anesthesia, only 10% of neurosurgeons use this option. As for the positioning issues there is instead conflicting data in literature: Rigamonti et al.<sup>7</sup> report that the prone and knee chest positions are equivalent, whereas Akinci et al.<sup>8</sup> showed more benefits with a jack-knife position. This uncertainty is reflected on the answers reported. Even in the case where there is a precise medico-legal indication, as for the use of a fluoroscope for the confirmation of the lumbar level to be operated, almost 9% of the surgeons did not report this practice. Moreover, the majority of neurosurgeons use the microscope or surgical loupes but as much as 17,5% don't use any magnifying device even though microdiscectomy showed its advantages as early as 1977 when was popularized by Yasargil and Caspar.<sup>9,10</sup> Although it can be inferred that the preference in use of a particular retractor over another

**Table 1.**

Perioperative variables		%
Anesthesia	General	90.7
	Spinal	9.3
Surgical positioning	Flexed	56.7
	Knee-Chest	35.1
Fluoroscope use	Simple prone	8.2
	Yes	90.7
Retractor use	No	9.3
	Caspar	68
Microscope or loupes	Taylor	20.6
	Williams	11.4
Local anesthetics	Yes	82.5
	No	17.5
Periradicular Gcs	No	32
	Pre-op	45.3
	Post-op	18.6
Day of mobilization	Pre + Post	4.1
	Yes	23.7
Prolonged hospitalization days after durotomy	No	76.3
	0	23.7
Day of discharge	>0	76.3
	0	25.8
	1	59.8
Days of corset prescription	>1	14.4
	1	25.8
	2	66
GCs prescription	>2	8.2
	0	75.3
	15	11.9
	30	7.2
Opioids and/or NSAIDs prescription	>30	5.6
	Yes	46.4
Neurotrophic drugs prescription	No	53.6
	Yes	7.2
Physiotherapy beginning day	No	92.8
	Yes	11.3
	No	88.7
Follow-up visit	Never	50
	15	6.1
	30	43.9
Follow-up visit	1 mo	65
	3 mo	10.3
	on request	24.7

er is simply a matter of personal or institutional habits, we believe that at least a choice of a magnification method must be made, since modern neurosurgical practices should always imply an adequate visual aid. The effectiveness of both topic GCs and local anesthetics has been well documented in literature,<sup>11-14</sup> nevertheless they are used only by 23% and 68% of surgeons, respectively. As for the mobilization issues, although there is no clear indication in literature, we noticed a clear tendency to mobilize the patients on the day after the operation and discharge them on the 1<sup>st</sup> or 2<sup>nd</sup> post-op day; moreover, orthopedic corsets are prescribed by up to 25% of surgeons. In accordance with literature, most surgeons do not excessively prolong the hospitalization in case of unintended durotomy.<sup>15,16</sup> Post-operative medical therapy is another controversial aspect: GCs are prescribed by 45%, whereas opioids and neurotrophic drugs are given by only 7% and 11%, respectively. These trends are in conflict with the most recent literature evidence.<sup>17-19</sup> Lastly, physiotherapy is routinely prescribed by almost 50% of surgeons and only 65% schedule a post-op follow-up at the time of discharge. Since this analysis has not revealed a substantial regional common practice in the perioperative management of LDH, we reckon that other factors may be implied in the differences of attitude between surgeons. The 22 departments of Neurosurgery have different case-loads and, more specifically, different surgeons perform LDH operations with variable frequencies. In this regard it must be said that most of our respondents operate less than 1 LDH per week (only 29% operate more than 50 LDH per year) and yet, in a similar study,<sup>20</sup> almost 70% of surgeons are said to operate more than 50 LDHs per year. Literature data has demonstrated that even for spinal surgery, the frequency of performing a given procedure is directly related to an increase in good results, in terms of satisfactory outcome and low complication rates.<sup>21</sup> On these premises we performed a comparison between the perioperative strategies adopted by high-volume surgeons (i.e.  $\geq 50$  cases per year) and those by low-volume ones. Surprisingly, no statistically significant differences were evident in any of the investigated items between the two groups. The fact that no specific trend was evident comparing the two groups may infer that even theoretically more expert surgeons share no relevant

routine to optimize peri-operative cares. In particular, apart from some basic recommendations (e.g., fluoroscopic checks, magnification), all of the other perioperative issues may not be as relevant as a good, state-of-the-art, central surgical time. We look forward to the results of a still ongoing, European Survey proposed via EANS by Dutch Authors well-renowned on this topic,<sup>22</sup> in order to compare our results on a bigger scale. New studies are, in fact, needed to evaluate the relevance of the numerous variables to account in the management of such a frequent disease. Paraphrasing a common proverb: the Devil may not be in the details but in adequate surgical skills.

## Conclusions

We retrieved significant differences in almost every aspect of the perioperative management of LDH in the neurosurgical community of a single, highly-populated region of Italy. Analyzing the data we have reported no evident regional habit nor could we assess that the case-volume by a single surgeon is a decisive variable for a defined treatment strategy. Further studies are needed to better understand the adequate perioperative management and its relevance in terms of outcome for the patients.

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## Disclosures & COI

The Authors report no conflicts of interest.

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