

Surgery for lumbar disc herniation, Demographic data and Analysis of Complications at King Hussein Medical City

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Abstract

Objectives: To evaluate the demographic characteristics, surgical safety in addition to highlighting major complications in 1525 consecutive patients who underwent microscopic inter-laminar discectomy electively at King Hussein Medical Center.

Methods: A series of 1525 consecutive patients underwent elective inter-laminar lumbar discectomy, during a 5-year period (January 2009 to January 2014) in our neurosurgical department, are analyzed retrospectively. Demographic features evaluated: Age, gender, site of surgery. In addition to general and specific complications encountered.

Results: Lumbar discectomy surgeries operated more commonly in male patients constituted with a percent of 64 % of all lumbar discectomies considered in this study, and it was more common in the age group between 40-60 year-old patients. The most common level operated was L4/L5 level, followed by the L5/S1 level. With a recurrence rate of 4.9% in all over levels operated, unintended durotomy occurred in 7.9 % of the surgeries, superficial wound infection and deep wound infection occurred in 3%, 0.5% respectively and the mortality rate was 1/1525.

Conclusion: Five-year follow-up demonstrate effective interlaminar approach in treatment of herniated lumbar disc with comparable complications to reported incidences worldwide. Demographic features were in line with reported results in terms of gender and age groups and slit deference regarding level of disc herniation.

Key words: Discectomy; durotomy, interlaminar discectomy, infection, Lumbar disc herniation; recurrence.

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Introduction

Degenerative disc disease nowadays is a common condition which causes anatomical and morphological changes leading to clinical syndromes.¹ it is commonly seen clinically as a disorder involving disc protrusion (central, paracentral, intraforaminal or far lateral). In cases that conservative therapies fail, surgery is the proper treatment. The first discectomy surgery was performed in 1906 by Oppenheim and Fedre Krause, however, the first article published in the literature dated 1934 belongs to Mixter and Bar², describing their surgical findings in 34 patients, their treatment at that time consisted of a hemilaminectomy for decompression³. While the concept was not met with universal acceptance, their work paved the way for improving surgical treatment of herniated discs over the years.⁴

Despite the fact that different procedures were evolved

afterwards to treat herniated lumbar disc such as; microscopic discectomy, fenestrated micro-discectomy, endoscopic discectomy and percutaneous procedures. We still believe that interlaminar lumbar discectomy is an effective technique for treating patients with herniated lumbar discs, the microscopic interlaminar discectomy in our confidence provides adequate decompression of the neural structures, gives an access to perform discectomy bilaterally if needed, confirms the freeness of both nerve roots and provides decompression secondary lumbar canal stenosis that can be associated with herniated disc.

Methods

The study group comprised of 1525 consecutive patients who underwent elective surgical intervention in a single centre using the same technique of lumbar inter laminar discectomy procedure, over a five-year

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period from January 2009 to January 2014. The clinical diagnosis was confirmed by radiological studies (CT scan, MRI...) in all patients. The indications for lumbar discectomy in our series were severe Low back pain associated with radiculopathy, progressive motor deficit, failure of conservative treatment, recurrent sciatica and a significant motor deficit with significant positive straight leg raising test. All surgeries included in the study were elective; patients who presented with cauda equina syndrome, more than one level disc surgery, and lumbar spine instability that were managed surgically were excluded from the study. Patients were classified into four age groups as shown in Table I.

Table I: Age wise patients groups.

Age group	Number	percentage
30<	168	11 %
30- 40	443	29 %
40-60	670	43.9 %
> 60	244	16 %

Surgical details

The surgical steps were common for all the cases and were as follows. With the patient in a prone position under general anesthesia, the level of the disc is marked with X-ray guidance. The region is draped in a standard, sterile fashion, A standard 3cm vertical midline incision centered over the appropriate interspace marked using anatomical landmarks and fluoroscopy, then skin and the subcutaneous tissues are opened , with sub periosteal dissection done down to the specified level to expose the spinous process and the lamina bilaterally. Fluoroscopy is used to reconfirm the level. When dealing with herniated lumbar disc, inter-laminar approach was used preserving the lamina as possible, a bilateral flavectomy exposed nerve root which was retracted medially or laterally depending on the position of the disc and through a transverse annulotomy all the loose disc material is removed, the disc space irrigated with normal saline to wash out any remaining free fragments. Facets were left undisturbed. The operating microscope was used in all of the cases.

Results

In total, 1525 patients included in our study, 976 patients were Male, constituted 64 %, while 549 female patients constituted a percentage of 36%. Mean of ages was 45.8 year, ranging between (17-72) year. The mean operative duration was 81 (66-123) min and the average postoperative hospitalization time 5 (2-7) days. The mean follow up was 37 months (24-82 months). Demographic features detailed in the Table II. In terms of the levels of lumbar disc herniation

encountered in general were at level L4/L5, followed by L5/S1, L3/L4, L2/L3, and the least L1/L2. Table III.

Table II: Demographic details of all patients

Parameter	patients number
GENDER	
Male	976
Female	549
AGE group	
>60	244
40-60	670
30-40	443
30>	168
Disc prolapse Level	
L1/2 level	9
L2/3 level	23
L3/4 level	119
L4/5 level	836
L5/S1 level	538

Table III: Levels wise of disc prolapse.

level	frequency	percentage
L4/L5	836	54.8 %
L5/S1	538	35.3 %
L3/L4	119	7.8%
L2/L3	23	1.5%
L1/L2	9	0.6%

Analyses conducted to evaluate the main complications encountered such as: recurrence of disc herniation, superficial and deep infections, Dural tears...etc. There were 249 cases developed operative complications amongst the 1525 primary discectomies; 119 cases had unintended durotomy during our study, constituted 7.9 % of all operations, 75 patients presented with recurrence. With the most common level of recurrence encountered was L4/L5 followed by L5/S1 overall as shown in Table IV In terms of wound infection (superficial and deep) occurred in 3% and 0.5% respectively.

Table IV: Complications wise details of all patients

Complication	patients number
Disc recurrence	75
Unintended durotomy	119
Wound infection	
Superficial	47
Deep	13

Table V: level wise incidence of recurrence.

Mortality rate through the five year period was 1/1525 patients and the cause of death was massive pulmonary embolism causing cardio-pulmonary arrest second day post operation.

Level	Number	percentage
L3/L4	5	6.7%
L4/L5	45	60%
L5/S1	25	33.3%

Discussion

Degenerative disc disease is a very prevalent disorder among adults, with reported lifetime occurrence as high as 40%.⁵ Lumbar discectomy is the most common surgical procedure performed worldwide in patients experiencing radiculopathy due to degenerative disc disease, different surgical approaches have evolved since the first discectomy done by Oppenheim and Fedre Krause in 1906,⁽¹⁻⁴⁾ still open inter-laminar micro-discectomy considered highly effective.^(6,7)

Open microscopic inter-laminar approach for lumbar disc herniation is the most common approach used for surgical management for lumbar disc herniation at King Hussein Medical City, 1525 consecutive surgery done over a period of five years from January 2009 to January 2014 have been reviewed retrospectively for demographic data analysis and surgical complications encountered for this approach, which were: recurrence of disc herniation, Unintended duratomy, and wound infection. In our study, the most common disc level operated was L4/L5 level followed by L5/S1 level, male patients were 64% of total population, while data reviewed from literature signifies that the most common level encountered was L5/S1 followed by L4/L5 level.^(3,4,8)

The most common age group who underwent surgical intervention for lumbar disc herniation was 40 to 60 years old patients 43.7%, followed by 30 to 40 years old patients; this is comparable to reported literature showing peak incidence at age of 40 years.⁽⁹⁾ Furthermore to address this we need more data gathering and analysis to try to identify factors that make an age group more susceptible for lumbar disc herniation than others. Considering the analysis of the complications observed in our patients, it is seen that some complications were more profound. Recurrence is one of the most common complications. The recurrence defines the herniation at the level that is operated on previously. The diagnosis was based on the development of new symptoms and signs that suggest the diagnoses confirmed by Gadolinium enhanced magnetic resonance imaging showing recurrent disc herniation at the level operated before. The overall with follow-up ranging from 2 years to 6 years. With the most common level of recurrence encountered was L4/L5 followed by L5/S1 overall as shown in Table V. Literature review showed that the incidence of same level recurrent lumbar disc herniation is in range of 5% to 18%⁽¹⁰⁻¹⁴⁾. We found that our rate of recurrence of lumbar disc herniation after open interlaminar microscopic discectomy is 4.9%, which is in line with reported rates worldwide for lumbar discectomy surgery. There have been multiple reports in the literature of Incidental duratomy occurring after lumbar spine surgery.

Studies have estimated the incidence of unintentional duratomy during lumbar spine surgery to be between 1% and 17%.⁽¹⁵⁻¹⁷⁾ There was 119 cases of Unintended duratomy during our study period, constituted 7.9 % of all operations, small punctures were managed by applying fat graft and gel foam, with bed rest and head down for 48 hours post operation, while large tears were managed by watertight closure using Vicryl 4.0, usage of fat patch was used according to the surgeon preference, but all were advised total bed rest for 72 hours before ambulation, Eight patients with unintended Dural tear needed lumbar drain insertion, while 2 patients needed reopening of the wound with re-closure of the Dural defect using same previous maneuver with fat patch applied over the repair. Meningitis developed in one patient who had dura tear and were treated medically with antibiotics. Comparing the incidence noticed in our series of microscopic interlaminar discectomy approach done at King Hussein Medical City, incidental duratomy was 7.9 %, which is comparable to the reported results. Surgical site infection post lumbar discectomy has been always troublesome problem in neurosurgical practice for surgeons and patients. Surgical site infections have been categorized in our study to superficial wound infection which are limited to the skin and sub dermal/subcutaneous layer without fascial involvement, and the second group is deep wound infection which includes spinal abscess and discitis. Diagnoses of superficial wound infection clinically by signs of wound infection localized to skin and swab culture of the wound which occurred in 3% of operations while deep wound infection occurred in 0.5% of procedures all were diagnosed by clinically by back pain, fever, elevated ESR and Gadolinium contrasted MRI showing evidence of paraspinal collection or discitis. One patient developed septicemia 3 days post operation, needed ICU admission and elective intubation, due to Fulminant hepatitis caused by blood transfusion done three weeks before his Discectomy. The reported incidence of superficial wound infection following lumbar discectomy is less than 3%, while reported incidence of postoperative discitis ranging from 0.2% to 2.75%,⁽¹⁷⁻²²⁾ comparing our rates of infection for superficial wound infection which is 3% and deep wound infection rate less than 0.9%. Patients with renal disorders, chronic steroid use, hemato-oncological disease, and diabetes, among others, had significantly higher incidence.

Conclusion

Open microscopic inter-laminar discectomy approach for lumbar disc extrusion is one of the most common lumbar disc herniation surgical approaches done

worldwide, offers significant advantages: in terms of safety and effectiveness. Five-year follow-up demonstrate demographic features were in line with reported results in terms of gender and age groups and slit deference regarding level of disc herniation. Rates of complications in our center are within the reported results worldwide.

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