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Comparison of Lumbar Fusion Surgery With/Without Isobar Device Among Patients With Lumbar Spine Degeneration

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Background: Lumbar spine fusion surgery, such as posterior lumbar inter-body fusion (PLIF) surgery, is a traditional procedure for treating lumbar spine degenerative (LDD) diseases. Studies revealed that lumbar fusion surgery may decrease pain and improve disability, but it may also induce adjacent segment disease (ASD), whereby segments at the upper and lower borders of the surgical site develop instability. The ISOBAR device has been developed and used in the lumbar fusion surgery for preserving postoperative lumbar spinal activity and preventing ASD. However, the relevant study is lack in Taiwan to compare the effectiveness of lumbar fusion surgery with ISOBAR device and PLIF (traditional lumbar fusion surgery without ISOBAR device).

Purpose: This study compared back pain and disability of patients undergoing lumbar spine fusion surgery with ISOBAR and without ISOBAR (PLIF surgery).

Methods: LDD patients who required initial lumbar fusion surgery and were diagnosed as herniated intervertebral disc (HIVD), spinal stenosis and spondylolisthesis, by a neurosurgeon were included. A purposive sample of 44 LDD patients undergoing lumbar fusion surgery with ISOBAR device (n=23) and PLIF surgery (n=21) from a big teaching hospital in Taiwan participated in this study. Data were collected from May, 2015 to May, 2017. Three questionnaires, including demographic questionnaire, Oswestry Disability Index (ODI), and Japanese Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ), were used to evaluate LDD patients before surgery and 6 months after surgery. JOABPEQ has 25 questions for assessing five domains of lower back pain, lumbar function, walking ability, social life function, and mental health. The Chronbach-α of JOABPEQ and ODI were .918 and .890, respectively, showing good reliability. Descriptive statistics, Wilcoxon signed rank test, Mann-Whitney U-test and Kruskal-Wallis test were used for data analysis.

Results: The mean (SD) age of ISOBAR group and PLIF group was 55.55±13.20 and 57.31±13.41, respectively. Six months after lumbar fusion surgery, both groups had significant improvement in back pain (JOABPEQ) and disability (ODI) (all $p < .01$). The ISOBAR group had better improvement in lower back pain, walking ability, social life function, mental health and disability than PLIF group (all $p<0.05$), but did not appear better improvement in the domains of lumbar function ($p=.135$). In the ISOBAR group, female patients had better improvement in social life function and mental health than the male (all $p<0.05$). The ISOBAR group had better improvement in social life function and ODI than the PLIF group in all age brackets and work categories. In the domain of mental health, ISOBAR group had better improvement than PLIF group in work categories (all $p<0.05$).

Conclusion: Lumbar fusion surgery with ISOBAR and PLIF surgery both can significantly improve back pain and daily disability for LDD patients. Lumbar fusion surgery with ISOBAR device helped significant improvement of social life function and mental health of LDD patients, especially in female and work categories. Furthermore, using ISOBAR device in the lumbar fusion surgery can have better improvement in social life function and daily function limitation than the traditional PLIF surgery. Due to ISOBAR is a self-payment (around 3,000~4,000 US dollars), it is hard to apply for every LDD patients broadly. However, we hope our results can help the LDD patients and clinical staff in making decision in the devices of surgery. Our study is the first related study in Taiwan. However, the data were collected from a large hospital in Taiwan. The generalization of our results may be limited.

Title:
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Keywords:
disability, fusion surgery with ISOBAR device and lumbar degenerative diseases

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Abstract Summary:
1.Lumbar fusion surgery with ISOBAR device and PLIF surgery both can reduce back pain & disability for patients with lumbar degenerations patients. 2.Lumbar fusion surgery with ISOBAR device had better efficacy in reducing back pain & disability than the PLIF surgery.

Content Outline:
I. Introduction

1. Introduce the traditional procedure for the treatment of lumbar spine degeneration and its consequences.
2. Emphasize the importance of this study.

II. Body

1. Described inclusion criteria in detail, and recruit participants appropriately after obtain IRB approval.
2. All of the measurement tools has good reliability and validity.
3. Choose appropriate statistics method for data analysis.

III. Conclusion

1. Demonstrate our study results and the limitation of this study.
2. Provide resources to clinical staffs for understanding the indication and clinical resultants of this new devices for the treatment of lumbar spine degeneration.

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