SURGICAL OF LUMBAR DISC HERNIATION
AT ZAINOEL ABIDIN GENERAL HOSPITAL BANDA ACEH:
EXPERIENCE WITH 28 PATIENTS

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Kata kunci: Hernia nucleus pulposus, terapi pembedahan, hernia pada vertebra lumbal

Introduction
Herniated nucleus pulposus lumbalis (HNPL) is a disease in which the intervertebral disc (soft gel disc or nucleus pulposus) pressed and ruptured, resulting in narrowing and pressed of spinal nerve. The cause of HNPL is still unclear, but several conditions have been associated with HNPL incidence including trauma, lifting injuries, age, sex, smoking, exposure to vehicle vibration, and idiopathic.1 It was also reported that HNPL is more common among fulltime workers and smokers.2 But in our opinion many HNPL patient that operated on at Zainoel Abidin Hospital no relation with fulltime worker and very close relation with smoker. HNPL causes large morbidity in patient because HNPL triggers to release inflammatory mediators that can directly cause pain, even in the absence of nerve compression.3 We don’t know exactly
about this phenomenon, because we didn’t examiner the inflammatory mediator in our hospital. The incident and prevalence of HNPL has been widely reported. The incidence and prevalence of HNPL are vary in some countries. The prevalence of symptomatic HNPL in Finland is about 1.03%. Prevalence of HNP in the U.S.A is approximately 1.6% of the population, whereas in England is about 2.2% of the population. Prasad et al. examined the epidemiology of HNPL in tertiary care hospitals in India which showed that the incidence of HNPL was approximately 13.3% of the population. Previously, Anderson [8] showed that the incidence of sciatica caused by HNPL was about 1-3% of the population. Overall, the incidence of HNPL is about 0.7 to 9.0% of the population and the prevalence is about 2.2 to 8% of the population.

Surgery is one of the options on HNPL management if conservative treatment failed. Although 90% quality of life patients improves with nonsurgical management, however 10-15% of cases require surgical management. Several studies have reported that HNPL surgery has good results. Tejapongvorachai et al. reported that surgery (discectomy procedure) in HNP patients has a good effectiveness. Another study documented (percutaneous disc decompresion technique has a good effectiveness in relieving radicular pain among HNP patients. Koga et al. reported a small surgical incision in HNPL patients resulted good outcome.

However, recently, there has been no study HNP surgery in Aceh. In this context, this study was conducted to explore some aspects of HNPL surgery in Zainoel Abidin General Hospital, Banda Aceh, and the only one hospital that can perform HNPL surgery in Aceh.

Methods

1. Study design
This study was a descriptive retrospective survey in Zainoel Abidin General Hospital, Banda Aceh, in August-September 2012. Sample of this study was all HNPL patients who underwent surgery in Zainoel Abidin General Hospital period 2010-2012. This study approved by the Institutional Review Board (IRB) Zainoel Abidin General Hospital.

2. Data collection
Data was collected from Medical Record Department of Zainoel Abidin General Hospital. Between January 2010 and August 2012, 28 HNPL patients who underwent surgery were documented. The following documented and potentially clinically relevant variables were employed for all outcomes: sex, age, intervertebral level of the intervention, and type of surgery.

3. Statistical analysis
All data obtained were presented descriptively and analyzed by one-way analysis of variance (Anova) to compare patient characteristics gender, age, intervertebral level of the intervention, and type of surgery with HNPL incidence.

Results
This research reported the incidence of surgical on HNPL patients in Zainoel Abidin General Hospitals. The total number of HNPL patients who underwent surgery in Zainoel Abidin General Hospital in period 2010-2012 shown in Figure 1. In addition, this study also reported relationship between patient characteristics (sex, age) and HNPL incidence; HNPL location and type of procedure related HNPL (table 1).
Figure 1. Distribution of HNPL cases in Zainoel Abidin General Hospital period 2010-2012. There were 28 HNPL patients who underwent surgery in given period; the highest incidence rate was in period January-April 2012 with 11 patients.

Table 1. The relationship between patient characteristics, HNP location, and type of procedure and HNPL incidence

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>19-40</td>
<td>7 (25)</td>
<td></td>
</tr>
<tr>
<td>&gt;40</td>
<td>21 (75)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>14 (50)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14 (50)</td>
<td></td>
</tr>
<tr>
<td>HNP location</td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>Lumbar</td>
<td>25 (89.28)</td>
<td></td>
</tr>
<tr>
<td>Sacral</td>
<td>3 (10.72)</td>
<td></td>
</tr>
<tr>
<td>Level of lumbar disc</td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>L2-L3</td>
<td>1 (3.57)</td>
<td></td>
</tr>
<tr>
<td>L4-L5</td>
<td>20 (71.42)</td>
<td></td>
</tr>
<tr>
<td>L5-S1</td>
<td>3 (10.71)</td>
<td></td>
</tr>
<tr>
<td>Multiple location</td>
<td>4 (14.28)</td>
<td></td>
</tr>
<tr>
<td>Type of procedure</td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>Hemilaminectomy with discectomy</td>
<td>27 (96.42)</td>
<td></td>
</tr>
<tr>
<td>Laminotomy with discectomy</td>
<td>1 (3.57)</td>
<td></td>
</tr>
</tbody>
</table>

NS, not significant

Vast majority (75%) patients, in this study, were more than 40 year and the incidence of HNPL in men and women were equal. In this study, we found that most HNPL patients were located in the lumbar (89.28%). Surgery is one of the procedures for patients with symptomatic HNPL to improve patient condition. In this study, hemilaminectomy with discectomy was the most common procedure used in HNPL patients (96.42%) followed by laminotomy with discectomy.

Discussion
Age is often associated with the risk of some diseases. However, the association between age and incidence of HNPL is still controversial. This study found that age was associated with HNPL. The theoretical concept of the relationship between age and HNPL incidence is still not well understood. Katsuno et al. conducted a study to elucidate the relationship of age to the production of nitride oxide (NO) and cytokines which is associated with nucleus
pulposus cells. It showed that NO levels increase with age. It indicates that the inflammatory reaction increases with increasing of age. It also showed that age associated with cytokine imbalance. Stress and aging affect the extracellular matrix components and changes in immune responses. Katsuno et al.\textsuperscript{15} suggested that the nucleus pulposus have cell-mediated immunity activity higher in young than in elderly. In contrary, there was no significant association between the incidences of HNPL due to trauma with patient age.\textsuperscript{16}

Interestingly, Yorimitsu et al.\textsuperscript{17} showed that the majority of the HNP patients were less than 35 years of age. This study found that some young adults who have HNPL. The incidence of HNPL in young was not widely studied yet. However, it is suspected that there is the role of gene. Higashino et al.\textsuperscript{1} found that patients aged less than 40 years with tryptophan allele (Trp2) showed more severe disc degeneration than those who do not have the allele Trp2. Conversely, patients aged 40 years or older showed no significant association between allele Trp2 with disc degeneration. This data suggest that the allele Trp2 is an age-dependent risk factor for severity of disc degeneration in young patients with HNPL.

The association between sex with the incidence of HNPL is still not well understood. This indicates that there is no clear correlation between sex with the risk of HNPL. This result is consistent with the results of previous studies. Rizzolo et al.\textsuperscript{16} found that there was no significant association between HNPL due to trauma with sex. This is also supported by Burke et al.\textsuperscript{18} which examines the proinflammatory mediators in patients with HNPL. It showed that interleukin (IL)-6, IL-8, and prostaglandin E2 (PGE2) was increased in patients with HNPL, but increased inflammatory mediators is not related to the gender of the patient.

HNPL can occur in the cervical, thoracic, lumbar, and sacral. In this study, most of HNPL was located in lumbar (89.28%). This result is consistent with the study of computed tomography scans performed by Delauiche-Calvallier et al.\textsuperscript{19} It showed that lumbar HNPL was most frequently found among patients observed. In line with data, Varanasi [20] also showed that most cases of HNPL (95%) occurred in the lumbar region, followed by cervical and thoracic regions, about 0.5 to 4% of all cases. In addition, this study found that most patients had HNPL at L4-L5 followed by L5-S1 and L2-L3. This result was consistent with previous studies that the most common level involved in lumbar disc herniation was L4-L5 followed by L5-S1.\textsuperscript{21,22,23} Recent study conducted by Udama et al.\textsuperscript{24} also showed that the most common site of HNPL was in the lumbar and the site of predilection was L4-L5 disc cartilage.

Surgery in patients with lumbar HNP is the main choice of therapy. Weinstein et al.\textsuperscript{25} compared the results of non-surgical management with surgery in patients with lumbar HNP. It indicates that surgery may improve the symptoms of the patient much better than non-surgical management. Peul et al.\textsuperscript{26} also showed that surgery in patients with sciatica due to lumbar HNP can improve symptoms faster compared with conservative management. Discectomy is a common and generally successful treatment for lumbar disc herniation.\textsuperscript{27}

Methods for performing discectomy are divided into minimal invasive and conventional. Conventional methods to perform discectomy are laminotomy and laminectomy.\textsuperscript{28} The effectiveness of laminectomy in patients with HNPL has been reported by several studies. Siddiq et al.\textsuperscript{29} found that laminectomy is most preferred surgery in patients with HNPL. Although laminectomy is a type of surgery that is considered expensive\textsuperscript{30} but this type of surgery is considered effective for recurrent HNPL.\textsuperscript{31} Hirsch et al.\textsuperscript{32} showed
that discectomy clearly association with reduced symptoms in patients with HNPL. Koga et al.\textsuperscript{12} showed that discectomy is the gold standard surgery for patients with a recurrent HNPL. Glenn et al.\textsuperscript{33} also showed that discectomy is the gold standard for recurrent HNPL and herniation that has been occurred in 3 locations. The types of surgery on HNPL differ according to location. Tejapongvorachai et al.\textsuperscript{10} suggested perform discectomy surgery on patients with thoracic HNPL. Nevertheless, several studies have reported the incidence of recurrent HNPL complications after discectomy. Some studies have reported the incidence of recurrent HNPL after discectomy.\textsuperscript{34,35}

In summary, in this study, HNPL was common in elderly and there was no association between HNPL incidence and sex. Lumbar, specifically L4-L5 was the most common location for HNPL and hemilaminectomy with discectomy was the most common procedure performed followed by laminotomy with discectomy.

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References