LITERATURE REVIEW

The management of post-stroke pain

Nina Devi Indrawati*, Laily Irfana¹, Yelvi Levani¹
1) Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia

ABSTRACT

Stroke is a metabolic illness that causes significant impairment in the working-age population. Disability develops due to the consequences of neurological deficiencies and the failure of the medical rehabilitation process. Post-stroke pain is one of the causes of this failure. In a post-stroke patient, pain is an unpleasant physical and emotional experience. In contrast, range of motion barriers might cause the medical rehabilitation procedure to fail. This paper aims to review the various methods of post-stroke pain management that can be used as an alternative therapy that helps post-stroke patients’ rehabilitation. The PubMed database was used to search for different kinds of literature. The study includes clinical studies, pilot studies, and randomized control trials published between January 2015 and June 2023. The authors omit several publications to ensure that the final selection of papers includes only the most relevant and reputable sources of information on post-stroke pain, post-stroke pain management, and pain as a measure of outcome. There are 28 publications to be reviewed. The most prevalent cause of post-stroke pain was hemiplegic shoulder pain in numerous studies that have an impact on the post-stroke recovery process. In conclusion, the options for post-stroke therapy range from conservative rehabilitation to interventional therapy. Several innovative experimental rehabilitation treatment approaches have been studied. However, the findings do not outperform conventional rehabilitation treatment.
INTRODUCTION

Stroke is a metabolic disease that has a high mortality and morbidity rate. It decreases productivity in adults aged 15 to 49. Stroke-related death and disability account for 15% of healthy life lost in those aged (Feigin et al., 2022). The impairment is caused by the inability of these patients to complete the physical rehabilitation phase and recover to a normal or near-normal quality of life. Pain is one of the causes of this failure (Payton & Soundy, 2020). Pain is a significant issue in stroke patients. The total pain prevalence in post-stroke patients was 29.56% (Paolucci et al., 2016). Post-stroke pain (PSP) affects several regions of the body, including the shoulder, knee, and brain, and has a detrimental impact. PSP affects several body regions, including the shoulder, knee, and brain, and significantly impacts these patients’ daily activities and return to work (Broussy et al., 2019; Mendigutía-Gómez et al., 2020). Hemiplegic shoulder pain has been found to harm stroke outcomes (Roy et al., n.d.). Patients with greater PSP levels had a higher prevalence of impairment (Rahmatian et al., 2023) PSP can lead to impairment as a result of a reduction in physical function, which can harm rehabilitation outcomes (Treister et al., 2017). Survivors who had more frequent pain reported worse quality of life, self-perceived health status, and post-stroke recovery interference (Westerling et al., 2020). It impedes recovery after a stroke. These produce significant discomfort and limited activity and can significantly inhibit recovery (Andersen, 1985; Garland, 1985; Griffin, 1986).

PSP causes patients to have a negative emotional experience and impairs their capacity to complete the post-stroke rehabilitation procedure. Unfortunately, caregivers and professionals continue to ignore pain as a subjective experience during examinations. It is also typical for analgesic medicines, including NSAIDs and opioids, to be abused. These can emerge due to the clinical inability to identify the primary cause of PSP pathogenesis. These can also occur due to patients seeking assistance to deal with discomfort. The use of opioid analgesics and NSAIDs has an impact on the cognitive function of stroke patients undergoing physical rehabilitation. The cognitive characteristics of analgesic medications are complicated and diverse. Opioids, tricyclic antidepressants, and anticonvulsants have all been linked to decreased cognitive performance in a variety of categories (Moriarty et al., 2011).

Detailed data collection on the various forms of PSP and their treatment is required. This information is necessary to understand the pathophysiology and offer an overview of PSP therapeutic options. Early PSP detection is needed to save individuals from developing chronic pain issues. Acute nociceptive pain can progress to chronic pain by the process of central and peripheral sensitization. Therefore, this paper aims to review the various methods of post-stroke pain management that can be used as an alternative therapy that helps post-stroke patients’ rehabilitation.

MATERIAL AND METHODS

The author used the PubMed platform to search for publications with the phrases “stroke” OR “post-stroke” AND “pain” to conduct a complete literature study on the management of post-stroke pain. To ensure a full overview of the literature on this issue, the study includes clinical studies, pilot studies, and randomized control trials published between January 2015 and June 2023. Only publications published in English and full-text articles were considered for the review.
The search returned many prospective information sources, including 277 publications about stroke and pain. The authors omit several publications to ensure that the final selection of papers includes only the most relevant and reputable sources of information on PSP, PSP management, and pain as a measure of outcome. There are 28 publications to be reviewed (see Figure 1).

**Figure 1.** PRISMA Flowchart

**Result**

**Management of Post Stroke Pain**

The author summarizes various treatments for post-stroke pain based on several publications, including research, pilot studies and ongoing studies. Most of the post-stroke pain treated in this study was hemiplegic shoulder pain. Pain clinical outcomes were assessed using a standardized assessment scale as listed in the following table.
### Diabetes Insipidus in Patients with Traumatic Severe Brain Injury

#### Case Report

Yudha Adi Prabowo1, Prananda Surya Airlangga2

1) Undergraduate Student, Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia  
2) Department of Parasitology, School of Medicine, Faculty of Medicine and Health Sciences, Universitas Airlangga University. 

### ABSTRACT

Diabetes insipidus occurs in the first 2 weeks after the injury. One complication of a severe brain injury is diabetes insipidus. There are no definitive data on the incidence of diabetes insipidus in Indonesia. The mortality rate of up to 50%. About 85% of mortality occurs within 2 weeks following the injury. One complication of severe brain injury is diabetes insipidus. There are no definitive data on the incidence of diabetes insipidus in Indonesia. The mortality rate of up to 50%. About 85% of mortality occurs within 2 weeks following the injury.

#### Keywords

Diabetes insipidus, traumatic severe brain injury, mortality rate, diabetes mellitus, health protocol, COVID-19.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Study Type</th>
<th>Participants</th>
<th>Mean ± SD</th>
<th>Intervention</th>
<th>Duration</th>
<th>Primary Outcome</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huang et al., 2017</td>
<td>Post Stroke Patients</td>
<td>21</td>
<td>I : 56 ±13 C : 59 ±13</td>
<td>Hemiplegic shoulder pain. I : therapeutic Kinesio taping C : conventional rehabilitation protocol</td>
<td>3 weeks</td>
<td>NRS Shoulder Pain and Disability Index (SPADI),</td>
<td>After treatment, there were significant differences in numerical pain (p=0.008) and SPADI (p=0.001) ratings in favor of the KT group. However, there were no significant between-group variations in the NRS (p = 0.705) or SPADI (p = 0.251) scores following intervention.</td>
</tr>
<tr>
<td>Lempka et al., 2017</td>
<td>Central Post Stroke Pain</td>
<td>9</td>
<td>52±9.8</td>
<td>Deep brain stimulation (DBS)</td>
<td>3 months,</td>
<td>Affective Pain Rating Index of the Short-form McGill Pain Questionnaire</td>
<td>There were no statistically significant changes in several outcome measures linked to the emotional domain of pain.</td>
</tr>
<tr>
<td>Hochsprung et al., 2017</td>
<td>First time Post stroke survivor</td>
<td>31</td>
<td>I1 : 63 ± 11.63</td>
<td>Hemiplegic Shoulder Pain I1 : Kinesio Tapping I2 : NMES Neuromuscular</td>
<td>4 weeks</td>
<td>VAS</td>
<td>Shoulder discomfort did not emerge in any of the groups during</td>
</tr>
</tbody>
</table>
### Case Report

A male, 45 years old, was taken to the hospital 12 hours after a traffic accident. He was diagnosed with severe brain injury and diabetes insipidus. The patient passed away five days after treatment in the Intensive Care Unit (ICU).

#### ABSTRACT

The incidence of diabetes insipidus is high in patients with traumatic severe brain injury. Desmopressin is the main treatment for diabetes insipidus in traumatic severe brain injury.

#### Method

A case report of a 45-year-old male who was diagnosed with severe brain injury and diabetes insipidus. The patient passed away five days after treatment in the ICU. Desmopressin was administered, but the patient did not show any improvement.

#### Conclusion

Desmopressin is the main treatment for diabetes insipidus in traumatic severe brain injury. However, in this case, the patient did not respond to desmopressin.

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<table>
<thead>
<tr>
<th>Authors</th>
<th>Reference</th>
<th>Patients</th>
<th>Age</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yudha Adi Prabowo, Prananda Surya Airlangga</td>
<td>(Chuang et al., 2017)</td>
<td>Post Stroke Patients (stroke more than 3 months)</td>
<td>38</td>
<td>Hemiplegic Shoulder Pain</td>
<td>I: Electromyography (EMG)-triggered NMES; C: Conventional treatment</td>
<td>The patient passed away in the first month after treatment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>58.89 ± 11.93</td>
<td></td>
<td>I: Electromyography (EMG)-triggered NMES; C: Conventional treatment</td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<td></td>
<td>3 times a week for 4 weeks</td>
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<td></td>
<td>Numerical Rating Scale supplemented with a Faces Rating Scale, and the short form of the Brief Pain Inventory. The secondary outcome measures were the upper-limb subscale of the Fugl-Meyer Assessment, and pain-free passive movement.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>At the one-year follow-up, EMG-triggered NMES with bilateral arm training was related with decreased pain intensity during active and passive shoulder movement (P = 0.007, P = 0.008), lower worst pain intensity (P = 0.003), and better pain-free passive movement.</td>
</tr>
</tbody>
</table>
Tidak ada data pasti tentang kejadian diabetes insipidus pada pasien dengan cedera otak traumatis.

Diabetes insipidus, termasuk pada pasien dengan cedera otak, adalah kondisi yang memerlukan perawatan yang tepat untuk memastikan kehidupan pasien sangat terpengaruh. Meskipun demikian, masih terdapat sedikit kesadaran umum tentang kondisi ini.

Penelitian yang dilakukan di Indonesia menemukan bahwa pasien dengan cedera otak sering mengalami hypernatremia, yang dapat menjadi penyebab diabetes insipidus. Kondisi ini diindikasikan dengan peningkatan kadar kehidupan pasien yang lebih tinggi. Pada beberapa kasus, pasien kehilangan gula darah akibat trauma yang dialami.

Diabetes insipidus, baik pada pasien dengan cedera otak atau pasien dengan peningkatan kadar kehidupan, sering kali memerlukan pencegahan dan pengobatan yang tepat. Oleh karena itu, penting untuk meningkatkan kesadaran umum dan pengetahuan masyarakat tentang diabetes insipidus, termasuk pada pasien dengan cedera otak.

Pencegahan dan pengobatan diabetes insipidus memerlukan upaya yang terintegrasi antara pasien, keluarga, dan komunitas. Selain itu, perawatan yang efektif memerlukan pemahaman yang baik tentang kondisi ini.

Pencegahan diabetes insipidus melibatkan pola hidup yang sehat, seperti makanan yang seimbang dan olahraga yang rutin. Selain itu, kesehatan mental juga penting untuk mencegah diabetes insipidus. Penderita yang mengalami stres atau depresi mungkin lebih banyak risiko mengalami diabetes insipidus.

<table>
<thead>
<tr>
<th>Study</th>
<th>Type of Injury</th>
<th>Sample Size</th>
<th>I Mean ± SD</th>
<th>Condition</th>
<th>Management</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Creamer et al, 2018)</td>
<td>Post stroke patients</td>
<td>60</td>
<td>56.1 ± 11.1</td>
<td>Hemiplegic shoulder pain</td>
<td>Intrathecal Baclofen</td>
<td>NPRS</td>
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<td></td>
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<td></td>
<td></td>
<td>(21 days for CMM arm and 2–25 days for ITB arm), followed by a 6-month active trial.</td>
</tr>
<tr>
<td>(Karaahmet et al, 2019)</td>
<td>Acute-Subacute Stroke patients</td>
<td>21</td>
<td>58 ± 17.5</td>
<td>Hemiplegic Shoulder Pain and Subluxation</td>
<td>Functional electrical Stimulation-cycling</td>
<td>NRS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>There is a significant variation in pain NRS ratings.</td>
</tr>
<tr>
<td>(Kim et al, 2019)</td>
<td>Post Stroke Patients</td>
<td>38</td>
<td>65.99 ± 4</td>
<td>Hemiplegic shoulder pain</td>
<td>Robotic-Assisted Shoulder Rehabilitation Therapy</td>
<td>VAS</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>On the visual analog scale, significant time and group interaction effects were seen.</td>
</tr>
<tr>
<td>(Ralph et al, 2020)</td>
<td>Chronic Stroke</td>
<td>22</td>
<td>57.3 ± 4.95</td>
<td>Hemiplegic shoulder pain</td>
<td>Etanercept (ENBREL®, Pfizer, USA) single-use injectable dose -- subcutaneously into the posterior cervical interspinous midline (into the interspace midway between vertical Numerical Pain Rating Scale (vNPRS))</td>
<td>Persipinal etanercept may give considerable and long-term improvements for chronic post-stroke pain management.</td>
</tr>
</tbody>
</table>
Tidak ada data pasti tentang kejadian diabetes insipidus pada pasien dengan cedera otak traumatis. Salah satu komplikasi dari cedera otak yang parah adalah diabetes insipidus. 

Cedera otak berat traumatis adalah cedera fatal, dengan tingkat kematian hingga 50%. Sekitar 1,5% kejadian fatal dari cedera otak disebabkan oleh diabetes insipidus.

Diabetes insipidus, brain injury, and 500,000 incidents of neurological sequelae. About 85% of mortality occurs within 2 weeks of injury. 

In this case report, a male, 45 years old, was taken to the Emergency Installation (IRD) after experiencing a pain after stroke, pain after arm surgery, the signs of diabetes insipidus were presented by hypernatremia, desmopressin, the patient's clinical and hemodynamic was not shown any improvements. The patient passed away in the Intensive Care Unit (ICU) with only 5 days of treatment in the intensive care.
<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Participants</th>
<th>Intervention</th>
<th>Duration</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Shin et al., 2019)</td>
<td>Post stroke patients</td>
<td>Hemiplegic Shoulder Pain</td>
<td>60</td>
<td>VAS pain rating scale</td>
</tr>
<tr>
<td>(Sezgin Ozcan et al., 2019)</td>
<td>Patients with poststroke complex regional pain syndrome (CRPS)</td>
<td></td>
<td>28</td>
<td>Significant improvements were found in both groups for pain severity (P&lt;0.005). The pain DETECT scores were greater in</td>
</tr>
</tbody>
</table>
ABSTRACT

Diabetes insipidus in patients with traumatic severe brain injury is adequate rehydration and administration desmopressin. Adequate hypovolemic, polyuric and brain injury are adequate rehydration and administration desmopressin. Main treatments for diabetes insipidus in traumatic severe are shown no improvements. The patient passed away in the post to the Emergency Installation (IRD) after experiencing a serious illness in the case group and 50 students in the control observational study with a case-control research design. This literature aims to know the degree of serious illness on week 2 and 6 post stroke onset of DM patients affected by Covid-19. It is hoped to have a risk of experiencing a higher complication of stroke, post stroke, and HSP for 1st Ay type and HSP for 1st Ay type. The VAS score of 2020 (Kasapoğlu et al., 2007) and the pain of shoulder pain at 4 weeks and 6 weeks for the intervention group were: C: 60.4 ± 11.6 ± 57.7 ± 44 patients. In the control group, the VAS score was: I: 14.6 ± 60.1 ± 58.4. Shoulder pain in the injection of 6 weeks: C: 98.9 ± 60.1 ± 58.4. Shoulder pain of 6 weeks: C: 98.9 ± 60.1 ± 58.4.
<table>
<thead>
<tr>
<th>(Terlemez et al., 2020)</th>
<th>Acute stroke within previous 24 months</th>
<th>30</th>
<th>P : 57,5</th>
<th>Hemiplegic Shoulder Pain</th>
<th>P : Local anesthetic (LA) injection into the trapezius muscle</th>
<th>VAS</th>
<th>the LA+CS group demonstrated a higher VAS decrease than the placebo group at 1 month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>I1 (Local Anestesi) : 64</td>
<td></td>
<td>I1 : LA injection into the suprascapular notch</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I2 (LA + CS) : 60</td>
<td></td>
<td>I2 : LA and corticosteroid (CS) injections into the suprascapular notch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hernandez-Ort et al., 2020)</td>
<td>Ischemic Stroke patients</td>
<td>19</td>
<td>Hemiplegic Shoulder Pain</td>
<td>I : Dry Needling Within or Outside Trigger Points</td>
<td>All participants received two treatment sessions including a rehabilitation program consisting of modulatory inter-ventions for muscle tone and motor control</td>
<td>NPRS</td>
<td>The reduction in shoulder discomfort was greater in the TrP dry needling group than in the non-TrP dry needling group, especially after two and four weeks (P &lt; 0.01).</td>
</tr>
<tr>
<td>(Aras et al., n.d.)</td>
<td>Post stroke patients</td>
<td>30</td>
<td>I : 652 ± 10,2</td>
<td>Hemiparetic Shoulder Pain</td>
<td>I : Suprascapular Nerve Pulsed</td>
<td>VAS</td>
<td>The decrease in VAS score was statistically significantly larger in the</td>
</tr>
</tbody>
</table>
Case Report

Diabetes insipidus in patients with traumatic severe brain injury requires complicated treatment. Therefore, definitive data on the incidence of diabetes insipidus in cases of brain injury are adequate rehydration and administration of desmopressin, although the immediate administration of hypernatremia, although the immediate administration of desmopressin, the patient's clinical and hemodynamic was 45 min (VAS), each session.

Correspondence:
1) Resident of Anesthesiology and Intensive Care of RSUD Dr. Soetomo, Medical Faculty of Airlangga University.

ABSTRACT

Scabies is a skin disease that is very difficult to get rid of (Pérez et al., 2020). This literature aims to know the degree of serious illness of Covid-19 patients by the comorbidity of DM in this pandemic, it has not been able to stop its spread. This study aimed to determine the relationship between the risk factors of diabetes mellitus towards Covid-19's outbreaks and the pandemic event.

Keywords:
Data analysis was done with the chi-square and some of the data was analyzed with the unpaired t-test. The level of significance was set at 5%.

Number of deaths reached 7.3%, which is higher than 1.2% (P 0.01). and scabies cases at the VIP Al-Huda Junior High School Kebumen, the number of patients with scabies increased from 163 in the first month, and the last month (19 vs. 1.2) showed that there was a decrease in the number of patients with scabies in the last month (19 vs. 1.2) shown as being decreased in the experimental group, while there was no significant change in the control group. Scabies is a skin disease that is very difficult to get rid of (Pérez et al., 2020). This literature aims to know the degree of serious illness of Covid-19 patients by the comorbidity of DM in this pandemic, it has not been able to stop its spread. This study aimed to determine the relationship between the risk factors of diabetes mellitus towards Covid-19's outbreaks and the pandemic event.

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Tidak ada data pasti tentang kejadian diabetes insipidus pada pasien dengan cedera otak traumatis.

**ARTICLE INFO**

1) Resident of Anesthesiology and Intensive Care of RSUD Dr. Soetomo, Medical Faculty of Airlangga University.

Hypernatremia corrections are the keys to the successful days five of treatment in the Intensive Care Unit (ICU). The use of desmopressin. Adequate hypovolemic, polyuric and of severe brain injury is diabetes insipidus. There are no definitive data on the incidence of diabetes insipidus in Indonesia. Pertama setelah cedera. Salah satu komplikasi dari cedera otak yang parah adalah diabetes insipidus. 

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<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Diagnosis</th>
<th>Duration</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tan &amp; Ja, 2021</td>
<td>Patients with HSP</td>
<td>36</td>
<td>51.1±11.4</td>
<td>Ultrasound-Guided BoNT-A (Botulinum Toxin A) Injection Into the Subscapularis</td>
<td>visual analogue scale score</td>
</tr>
<tr>
<td>Saha et al., 2021</td>
<td>Post stroke patients</td>
<td>38</td>
<td>57.40±4.91</td>
<td>Stroke rehabilitation program + Mirror Therapy</td>
<td>NPRS</td>
</tr>
<tr>
<td>Lannin et al., 2022</td>
<td>Post Stroke Patients</td>
<td>140</td>
<td>62</td>
<td>Botulinum toxin-A plus 3 months of evidence-based movement training</td>
<td>VAS</td>
</tr>
</tbody>
</table>

C: placebo injections
C: placebo
C: stroke rehabilitation program

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Keywords:
- Hypernatremia
- Diabetes insipidus
- Traumatic severe brain injury

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Participants who received the BoNT-A injection reported a substantial reduction in pain (visual analogue scale, 1.39 [95% CI, 2.41 to 0.36]; P=0.002). When compared to the control group, improvements were more significant (P 0.05) in the experimental group with mirror treatment for all three measures.
Discussion

The Type and Pathophysiology of Post Stroke Pain

Several forms of post-stroke pain and their pathogenesis have been described in the prior literature, including central post-stroke pain, complicated regional pain syndrome, pain associated with stiffness and subluxation, and painful condition of the hemiplegic shoulder (Treister et al., 2017). According to our analysis of the literature, the most prevalent cause of post-stroke pain was hemiplegic shoulder pain in numerous studies. This contradicts previous epidemiological research. Musculoskeletal pain is the leading cause of post-stroke pain in all stages of stroke, followed by shoulder pain, CPSP, headache, and pain-related spasticity (Paolucci et al., 2016). The most often addressed is hemiplegic shoulder discomfort, which impacts the post-stroke recovery process.

Following a stroke, individuals’ daily lives are hampered by shoulder discomfort (Lindgren et al., 2007).

Hemiplegic Shoulder Pain

Hemiplegic shoulder discomfort can be caused by a variety of factors, including shoulder subluxation, post-stroke stiffness and contractures, and rotator cuff abnormalities (Treister et al., 2017). Shoulder subluxation occurs when the glenohumeral joint’s mechanical integrity is disrupted, leading in a perceptible separation between the acromion and the humeral head (Figure 2).

Spasticity is described as a velocity-dependent increase in muscle tone that is accompanied by a hyperactive stretch reflex. The subscapularis is an internal rotator of the shoulder that also helps in arm abduction and extension from a flexed posture (Figure 3).

Figure 2. Normal shoulder (A) and shoulder subluxation (B): the supraspinatus is flaccid during the early phase of hemiplegia. The weight of the arm might cause humeral head subluxation toward the inferior margin of the glenoid cavity (Treister et al., 2017).
Diabetes insipidus in patients with traumatic severe brain injury occurs in the first 2 weeks after the injury. One complication from severe brain injury is diabetes insipidus. There are more than 50,000 deaths and 500,000 incidents of diabetes insipidus in patients with traumatic severe brain injury (Somi et al., 2013; Wasner et al., 2008). In this case report, a male, 45 years old, was taken to the hospital 12 hours before being hospitalized. After treatment, the patient did not show any improvement. The patient passed away in the first week of hospitalization.

**Central Post Stroke Pain (CPSP)**

Central poststroke pain (CPSP), a kind of neuropathic pain induced by central nervous system injury following cerebrovascular accidents, is one of the most prevalent stroke sequelae (Klit et al., 2009). CPSP has been linked to a variety of variables, including sensory deafferentation, spinothalamic dysfunction, and central sensitization and disinhibition in pain networks (Boivie et al., 1989; Hosomi et al., 2013; Wasner et al., 2008). The spinothalamic tract, which transmits pain, temperature, and deep touch from the body, is the most researched tract related with pain. The spinothalamic tract runs from the lateral section of the spinal cord to the ventral posterolateral nucleus (VPL) of the thalamus, eventually terminating in the postcentral gyrus (Figure 4). CPSP can be caused by lesions or damage to any region of this tract; however, some structures are more strongly connected with this condition than others (Treister et al., 2017).

**Complex Regional Pain Syndrome**

Complex regional pain syndrome (CRPS) is defined by pain as well as sensory, autonomic, trophic, and motor abnormalities (Marinus et al., 2011). A difference is established between CRPS-1 and CRPS-2, in which a nerve lesion cannot be found (Marinus et al., 2011).
CONCLUSION

According to the literature analysis above, there is a lot of research on managing hemiplegic shoulder discomfort. The options for post-stroke therapy range from conservative rehabilitation to interventional therapy. Several innovative experimental rehabilitation treatment approaches have been studied. However, the findings do not outperform conventional treatment for rehabilitation. It is provided that by understanding the numerous therapeutic options for post-stroke pain, neurologists would be able to carry out post-stroke pain management thoroughly, with the ultimate objective of pain-free patients. The achievement of pain-free patients can increase the patient’s quality of life. Furthermore, the disability rate of post-stroke patients will not rise. Patients recovering from a stroke are expected to be able to resume their regular activities without experiencing pain or a deterioration in quality of life.

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**ABSTRAK**

Correspondence: 

Keywords: 

**QANUN MEDIKA** in the case of being handled improperly, it can bring death. 

Definitive data on the incidence of diabetes insipidus in cases of severe brain injury is diabetes insipidus. There are no signs of desmopressin. Adequate hypovolemic, polyuric and brain injury are adequate rehydration and administration of desmopressin, the patient’s clinical and hemodynamic was not shown any improvements. The patient passed away in the last five days of treatment in the Intensive Care Unit (ICU). The data was collected from December 2021 to February 2022. In this case report, a male, 45 years old, was taken to the Emergency Installation (IRD) after experiencing a traffic accident 12 hours before being hospitalized. After surgery, the signs of diabetes insipidus was presented by the patient.


