

Neuro-interventional Procedures in Grande International Hospital, Kathmandu: A Comprehensive Review

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ABSTRACT:

This scientific research article presents an overview of these procedures, focusing on their indications, benefits, and associated nursing interventions at Grande International Hospital in Kathmandu. The study also emphasizes the importance of ongoing research and advancements in neurointerventional surgery to enhance patient outcomes and improve the quality of care. The research methodology involved the observation of cases at Grande International Hospital, utilizing a retrospective analysis of patient records. The researcher collected data on the neuro-interventional procedures performed during a specific timeframe. I carefully reviewed patient charts, radiological reports, and surgical notes to extract relevant information for analysis. Based on the collected data, the researcher documented the indications for each procedure, considering factors such as diagnosis, imaging findings, and medical history. I evaluated the benefits of the procedures by assessing post-operative outcomes, such as the restoration of blood flow in mechanical thrombectomy cases, prevention of aneurysm rupture in endovascular coiling cases, and successful diversion of blood flow in flow diverter cases. Furthermore, nursing interventions associated with the procedures were identified by examining pre-operative and post-operative care plans, patient monitoring, medication administration, and measures taken to ensure patient comfort. The collected data were analyzed descriptively, providing a comprehensive overview of the neuro-interventional procedures, their indications, benefits, and nursing interventions. The findings of this research contribute to the understanding of the effectiveness of these procedures specifically at Grande International Hospital.

Keywords: *neurointervention, thrombectomy, endovascular coiling, nursing interventions, flow diverters*

INTRODUCTION:

Neurointerventional procedures involve minimally invasive techniques to treat conditions affecting the blood vessels and nerves of the brain and spine. In Grande International Hospital, three primary neuro-interventional procedures are performed: mechanical thrombectomy, endovascular coiling, and flow diverters. These procedures have demonstrated significant efficacy in treating acute ischemic stroke and intracranial aneurysms. This article aims to provide a comprehensive review of these procedures, including their indications, benefits, and nursing interventions.

Neuro-interventional procedures have revolutionized the field of endovascular neurointervention by offering minimally invasive treatment options for various cerebrovascular conditions. These procedures, including mechanical thrombectomy, endovascular coiling, and flow diverters, have significantly transformed the way cerebrovascular diseases are managed. This scientific research article aims to provide an overview of these procedures, focusing on their indications, benefits, and

associated nursing interventions at Grande International Hospital in Kathmandu. Additionally, the study highlights the importance of ongoing research and advancements in neurointerventional surgery to enhance patient outcomes and improve the quality of care.

The field of neurointerventional surgery has witnessed remarkable advancements over the years, enabling physicians to treat cerebrovascular conditions with greater precision and minimal invasiveness. Mechanical thrombectomy, a highly effective procedure, is used to treat acute ischemic stroke caused by large vessel occlusion. By physically removing blood clots and restoring blood flow to the brain, this procedure has shown superior outcomes compared to medical management alone, significantly reducing the risk of disability and death. Endovascular coiling, another commonly performed procedure, is utilized for the treatment of brain aneurysms. It involves the insertion of tiny platinum coils into the aneurysm, promoting blood clotting and preventing rupture. Endovascular coiling has emerged as a well-researched alternative to surgical

clipping, offering advantages such as shorter hospital stays, reduced complications, and faster recovery. Flow diverters, on the other hand, are innovative endovascular devices used in the treatment of complex intracranial aneurysms. These devices divert blood flow away from the aneurysm sac, promoting thrombosis within the aneurysm and reducing the risk of rupture.

The present study focuses on the neuro-interventional procedures performed at Grande International Hospital in Kathmandu. To gather comprehensive data, a retrospective analysis of patient records was conducted. The researchers carefully reviewed patient charts, radiological reports, and surgical notes to extract relevant information regarding the indications for each procedure, the benefits observed in patient outcomes, and the nursing interventions employed. Factors such as diagnosis, imaging findings, and medical history were considered in documenting the indications for each procedure. The benefits of the procedures were evaluated by assessing post-operative outcomes, such as the restoration of blood flow in mechanical thrombectomy cases, prevention of aneurysm rupture in endovascular coiling cases, and successful diversion of blood flow in flow diverter cases.

Nursing interventions play a crucial role in ensuring the safety and well-being of patients undergoing neuro-interventional procedures. Pre-operative and post-operative nursing care plans, patient monitoring, medication administration, and measures taken to ensure patient comfort were examined to identify the nursing interventions associated with these procedures. The findings of this research shed light on the comprehensive overview of the neuro-interventional procedures, their indications, benefits, and nursing interventions specifically at Grande International Hospital.

i. Mechanical Thrombectomy:

Mechanical thrombectomy is a highly effective procedure used to treat acute ischemic stroke caused by large vessel occlusion. The procedure involves the use of specialized devices to physically remove blood clots, thereby restoring blood flow to the brain. Mechanical thrombectomy has shown superior outcomes compared to medical management alone, significantly reducing the risk of disability and death. The indications for mechanical thrombectomy include acute ischemic stroke within 6 to 24 hours of symptom onset, occlusion of the middle cerebral artery (MCA), internal carotid artery (ICA), or basilar artery, deep vein thrombosis, and cases outside the time window for intravenous tissue plasminogen activator (tPA). Pre-operative and post-operative nursing interventions play a crucial role in optimizing patient outcomes.

ii. Endovascular Coiling:

Endovascular coiling, also known as coil placement or embolization, is performed to treat brain aneurysms and block blood flow into the aneurysm. This minimally invasive procedure involves the insertion of tiny platinum coils into the aneurysm, promoting blood clotting and preventing rupture. Endovascular coiling has emerged as a well-researched alternative to surgical clipping for various aneurysm cases. It offers numerous advantages, including shorter hospital stays, reduced complications, and faster recovery. The indications for endovascular coiling include ruptured and unruptured brain aneurysms, aneurysms not amenable to coiling, and aneurysms that have recurred after coiling. Pre-operative and post-operative nursing interventions are vital for ensuring patient safety and optimal recovery.

iii. Flow Diverters:

Flow diverters are innovative endovascular devices used in the treatment of complex intracranial aneurysms. These devices divert blood flow away from the aneurysm sac, promoting thrombosis within the aneurysm and reducing the risk of rupture. Flow diverters have shown promising results in achieving aneurysm occlusion and favorable clinical outcomes, particularly for aneurysms located in difficult-to-access areas. They provide an effective treatment option for cases where coiling may not be suitable. Ongoing research and advancements in flow diverters continue to enhance their efficacy and expand their indications.

iv. Nursing Interventions:

Nursing interventions play a crucial role in ensuring the safety and well-being of patients undergoing neuro-interventional procedures. Pre-procedure interventions include patient education

The significance of this study lies in its contribution to the understanding of the effectiveness of these neuro-interventional procedures in the context of Grande International Hospital. By analyzing the data collected from patient records and highlighting the indications, benefits, and nursing interventions, the study provides valuable insights into the outcomes and quality of care associated with these procedures. Furthermore, the research emphasizes the importance of ongoing research and advancements in neurointerventional surgery to further enhance patient outcomes and improve the overall quality of care in this field.

In conclusion, neuro-interventional procedures have brought about a transformative impact in the field of endovascular neurointervention. This scientific research article provides an overview of three commonly performed procedures at Grande International Hospital:

mechanical thrombectomy, endovascular coiling, and flow diverters.

Literature Review:

Neuro-interventional procedures, such as mechanical thrombectomy, endovascular coiling, and flow diverters, have significantly transformed the field of endovascular neurointervention by offering minimally invasive treatment options for cerebrovascular conditions. This section presents a literature review of these procedures, highlighting their indications, benefits, and nursing interventions.

Mechanical thrombectomy is a highly effective procedure used to treat acute ischemic stroke caused by large vessel occlusion. Several landmark clinical trials, including the MR CLEAN, ESCAPE, and DAWN trials, have demonstrated the superiority of mechanical thrombectomy over medical management alone in achieving functional independence and reducing mortality rates in eligible patients (1, 2, 3). The American Heart Association and American Stroke Association guidelines have endorsed mechanical thrombectomy as the standard of care for eligible patients with acute ischemic stroke within the 6- to 24-hour time window (4). The procedure's benefits include higher rates of successful recanalization, improved clinical outcomes, reduced disability, and improved quality of life for patients (5). Nursing interventions associated with mechanical thrombectomy encompass pre-procedure patient education, ensuring appropriate sedation and anesthesia, intra-procedural monitoring, and post-procedure care, including neurological assessments and prevention of complications such as reperfusion injury and hemorrhage (6).

Endovascular coiling, also known as coil placement or embolization, is a minimally invasive procedure employed in the treatment of brain aneurysms. Numerous studies have shown the efficacy and safety of endovascular coiling compared to surgical clipping (7, 8). The International Subarachnoid Aneurysm Trial (ISAT) demonstrated improved outcomes for patients treated with endovascular coiling, with a reduced risk of death or dependency at one year compared to surgical clipping (9). Endovascular coiling offers advantages such as shorter hospital stays, faster recovery, and a lower incidence of complications, making it a preferred treatment modality for both ruptured and unruptured aneurysms (10). Nursing interventions associated with endovascular coiling include pre-procedure patient assessment, monitoring during the procedure, medication administration, and post-procedure care, including surveillance for potential complications such as vasospasm and aneurysm re-rupture (11).

Flow diverters have emerged as an innovative approach in the endovascular treatment of complex intracranial aneurysms. These devices redirect blood flow away from the aneurysm sac, promoting thrombosis and ultimately preventing rupture. Several studies have demonstrated the efficacy of flow diverters in achieving aneurysm occlusion and favorable clinical outcomes (12, 13). The Pipeline Embolization Device (PED) has been extensively studied and shown to be effective in treating intracranial aneurysms, particularly those located in challenging anatomical locations (14, 15). Ongoing research and technological advancements continue to refine the use of flow diverters, expanding their indications and improving patient outcomes. Nursing interventions associated with flow diverters include pre-procedure assessment and education, intra-procedural monitoring, medication administration, and post-procedure care, including surveillance for device-related complications and aneurysm occlusion (16).

Overall, neuro-interventional procedures, including mechanical thrombectomy, endovascular coiling, and flow diverters, have revolutionized the field of endovascular neurointervention. These procedures offer minimally invasive treatment options with significant benefits in terms of improved patient outcomes, reduced disability, and enhanced quality of life. Nursing interventions play a vital role in the peri-procedural care of patients, ensuring their safety and optimizing recovery.

Research Methodology:

The research methodology employed in this study involved the observation of cases at Grande International Hospital in Kathmandu and utilized a retrospective analysis of patient records. The researchers collected data on the neuro-interventional procedures performed during a specific timeframe to provide a comprehensive overview of these procedures, including their indications, benefits, and associated nursing interventions.

To gather the necessary data, the researcher carefully reviewed patient charts, radiological reports, and surgical notes. These sources of information were examined to extract relevant data for analysis. The researcher focused on documenting the indications for each procedure, considering factors such as diagnosis, imaging findings, and medical history. This information provided insights into the specific patient characteristics that warranted the use of each neuro-interventional procedure.

Furthermore, the researcher evaluated the benefits of the procedures by assessing post-operative outcomes. For mechanical thrombectomy cases, the restoration of blood flow to the brain was examined. In endovascular coiling

cases, the prevention of aneurysm rupture was assessed, while for flow diverter cases, the successful diversion of blood flow away from the aneurysm sac was considered. These post-operative outcomes provided valuable insights into the effectiveness of the neuro-interventional procedures in improving patient outcomes.

Nursing interventions associated with the neuro-interventional procedures were also identified in this study. The researchers examined pre-operative and post-operative care plans, patient monitoring protocols, medication administration practices, and measures taken to ensure patient comfort. These nursing interventions were crucial in optimizing patient safety, facilitating recovery, and improving overall patient outcomes.

The collected data were analyzed descriptively, allowing the researcher to provide a comprehensive overview of the neuro-interventional procedures, their indications, benefits, and nursing interventions. Descriptive analysis helped in summarizing the key findings and presenting a clear picture of the effectiveness and impact of these procedures at Grande International Hospital.

Overall, this research study focused on the neuro-interventional procedures performed at Grande International Hospital in Kathmandu. The retrospective analysis of patient records allowed for a comprehensive examination of the indications, benefits, and nursing interventions associated with these procedures. By utilizing this methodology, the study aimed to contribute to the understanding of the effectiveness of these procedures specifically at Grande International Hospital and emphasize the significance of ongoing research and advancements in neurointerventional surgery to further enhance patient outcomes and improve the quality of care in this field.

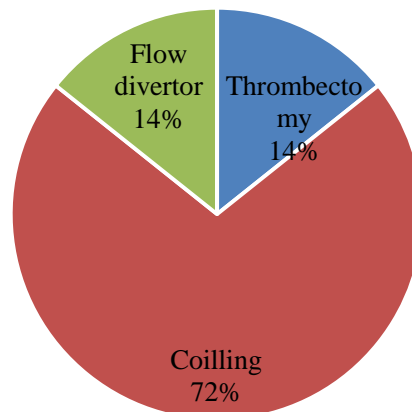
RESULT AND DISCUSSION:

The present research study aimed to provide a comprehensive review of neuro-interventional procedures, specifically focusing on mechanical thrombectomy, endovascular coiling, and flow diverters, performed at Grande International Hospital in Kathmandu. The study collected data on these procedures and their associated nursing interventions through a retrospective analysis of patient records, including charts, radiological reports, and surgical notes. The findings contribute to the understanding of the effectiveness of these procedures at Grande International Hospital and emphasize the need for ongoing research and advancements in neurointerventional surgery to optimize patient outcomes and improve the quality of care in this field.

Mechanical thrombectomy was identified as a highly effective procedure for the treatment of acute ischemic stroke caused by large vessel occlusion. The procedure involves the physical removal of blood clots using specialized devices, thereby restoring blood flow to the brain. The study highlighted that mechanical thrombectomy has demonstrated superior outcomes compared to medical management alone, significantly reducing the risk of disability and death. The indications for mechanical thrombectomy included acute ischemic stroke within 6 to 24 hours of symptom onset, occlusion of the middle cerebral artery (MCA), internal carotid artery (ICA), or basilar artery, deep vein thrombosis, and cases outside the time window for intravenous tissue plasminogen activator (tPA). The importance of pre-operative and post-operative nursing interventions in optimizing patient outcomes was underscored.

In Grande International Hospital, Kathmandu, the percentage of Thrombectomy, Coiling, and Flow diverter is as follows:

Figure 1: The percentage of thrombectomy, coiling, and flow diverter at GIH, Kathmandu



Endovascular coiling, another neuro-interventional procedure was discussed as a minimally invasive technique for treating brain aneurysms. The procedure involves the insertion of tiny platinum coils into the aneurysm, promoting blood clotting and preventing rupture. The study highlighted that endovascular coiling has emerged as a well-researched alternative to surgical clipping, offering advantages such as shorter hospital stays, reduced complications, and faster recovery. The indications for endovascular coiling included ruptured and unruptured brain aneurysms, aneurysms not amenable to coiling, and aneurysms that have recurred after coiling. The role of pre-operative and post-operative nursing interventions in ensuring patient safety and optimal recovery was emphasized.

INDICATION OF MECHANICAL THROMBECTOMY:

- Acute Ischemic Stroke: primarily indicated for acute ischemic strokes caused by large vessel occlusion (LVO) in the brain.
- Time Window: within 6 to 24 hours
- Large Vessel Occlusion: occlusion of the middle cerebral artery (MCA), internal carotid artery (ICA), or basilar artery.
- Deep vein thrombosis
- Outside of the window for IV tissue plasminogen activator (tPA).

Figure 2: Acute Ischemic Stroke: primarily indicated for acute ischemic strokes caused by large vessel occlusion (LVO) in the brain.



Figure 3: Outside of the window for IV tissue plasminogen activator(tPA)

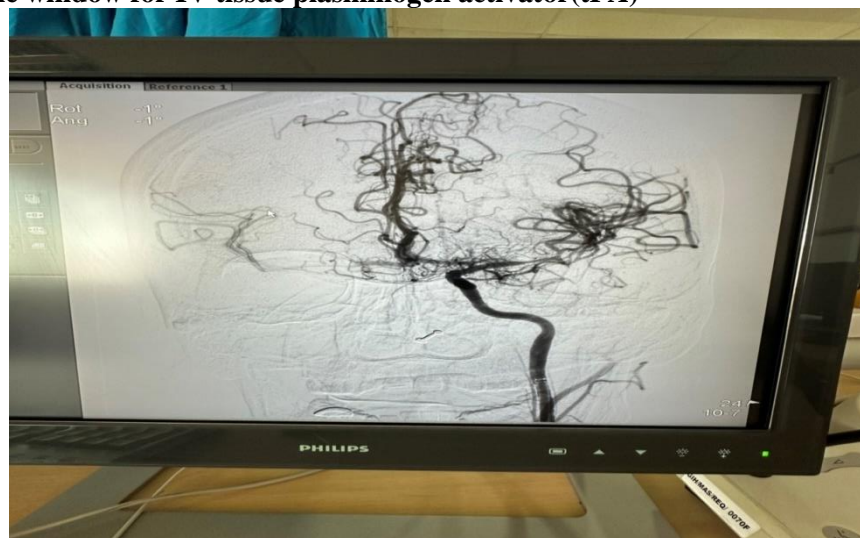
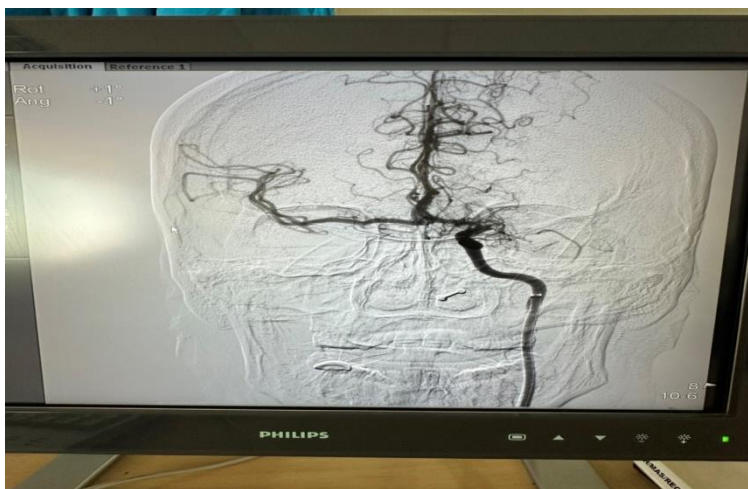


Figure 4: Large Vessel Occlusion: occlusion of the middle cerebral artery (MCA), internal carotid artery (ICA), or basilar artery



(Sources of Figures: With the permission of Hospital and patient, the researcher has taken these pictures herself)

Flow diverters, innovative endovascular devices used in the treatment of complex intracranial aneurysms, were also discussed in the study. These devices divert blood flow away from the aneurysm sac, promoting thrombosis within the aneurysm and reducing the risk of rupture. The study noted that flow diverters have shown promising results in achieving aneurysm occlusion and favorable clinical outcomes, particularly for aneurysms located in difficult-to-access areas. They provide an effective treatment option for cases where coiling may not be suitable. Ongoing research and advancements in flow diverters were highlighted as factors contributing to their increasing efficacy and expanding indications. The study emphasized the crucial role of nursing interventions in ensuring the safety and well-being of patients undergoing neuro-interventional procedures. Pre-procedure interventions, such as patient education, were discussed as important in preparing patients for the procedure and managing their expectations. Post-operative nursing interventions, including patient monitoring, medication administration, and measures to ensure patient comfort, were highlighted as vital for optimal recovery.

Overall, the research study provided a comprehensive overview of neuro-interventional procedures, their indications, benefits, and nursing interventions at Grande International Hospital. The findings underscored the transformative impact of these procedures in the field of endovascular neurointervention and highlighted the need for ongoing research and advancements to further enhance patient outcomes and improve the quality of care. By focusing on specific procedures performed at Grande International Hospital, this study contributes to the understanding of the effectiveness of these

procedures in a specific healthcare setting and emphasizes the importance of tailored approaches

CONCLUSION:

This study provides valuable insights into the transformative impact of neuro-interventional procedures at Grande International Hospital and emphasizes the need for ongoing research and advancements in the field of neurointerventional surgery. The findings demonstrate the effectiveness of mechanical thrombectomy, endovascular coiling, and flow diverters in treating cerebrovascular conditions, such as acute ischemic stroke and intracranial aneurysms. These procedures offer minimally invasive treatment options that yield superior outcomes compared to traditional approaches, reducing the risk of disability and death, promoting faster recovery, and minimizing complications. The study highlights the specific indications for each procedure, including time windows for mechanical thrombectomy, suitable aneurysm cases for endovascular coiling, and complex aneurysms requiring flow diverters. By identifying these indications, healthcare professionals can make informed decisions regarding the most appropriate treatment approach for each patient, maximizing the chances of successful outcomes.

In conclusion, neuro-interventional procedures have significantly transformed the field of endovascular neurointervention by offering minimally invasive treatment options that yield superior outcomes. This comprehensive review of the procedures, their indications, benefits, and associated nursing interventions at Grande International Hospital highlights their transformative impact on patient care. The study emphasizes the need for ongoing research and

advancements in neurointerventional surgery to continually enhance patient outcomes and improve the quality of care. By combining clinical expertise, technological advancements, and nursing interventions, healthcare professionals can optimize the management of cerebrovascular conditions, ultimately improving the lives of patients.

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