



بازیابی هوشیاری و توانبخشی در مریض مبتلا به تفتق نسج مغزی

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چکیده

اطلاعات مقاله

زمینه: کرانیوپلاستی (CP) پس از کرانیوکتومی به دلیل تروما، یک روش جراحی مغز و اعصاب است که هدف آن بازگرداندن زیبایی، بهبود دینامیک مایع مغزی-نخاعی (CSF) و حفاظت از مغز می‌باشد. این گزارش به شرح مدیریت و نتایج درمان یک مریض با آسیب شدید سر ناشی از حادثه ترافیکی می‌پردازد که با زخم نامنظم بزرگ و شکستگی استخوان در ناحیه جداری (پاریتل) و بیرون‌زدگی نسج مغزی به شفاخانه منتقل شده بود.

معرفی موضوع: مریض مورد نظر پس از حادثه ترافیکی در حالت شوک و بیهوشی به شفاخانه منتقل گردید. معاینه‌ها نشان‌دهنده زخم نامنظم حدود ۱۰ سانتی‌متری در ناحیه جداری سر همراه با بیرون‌زدگی نسج مغزی بود. با تثبیت وضعیت عمومی و عادی شدن علائم حیاتی، مداخله جراحی فوری برای کنترل خونریزی، جلوگیری از تفتق نسج مغزی و ترمیم شکستگی‌های استخوانی انجام شد. همچنین، جراحی‌های بعدی برای اصلاح نقص استخوانی در نواحی فرانتوپاریتل و سوپرااوربیتل صورت گرفت که به بهبود کلی وضعیت مریض منجر گردید.

نتیجه‌گیری: این گزارش نشان‌دهنده توانایی متخصصان محلی در مدیریت موفق مریضان با آسیب‌های وخیم سر در افغانستان است، کشوری که به دلیل جنگ‌های طولانی مدت دسترسی محدودی به خدمات صحی داشته است. مدیریت مناسب، نظارت دقیق، و جراحی‌های لازم نه تنها جان مریضان را نجات می‌دهد، بلکه نتایج بالینی بهتری به همراه دارد. این مورد بر اهمیت سرمایه‌گذاری در زیرساخت‌های صحی داخلی تأکید کرده و ضرورت ارائه خدمات تخصصی در داخل کشور را به‌عنوان راهکاری برای کاهش معلولیت و مرگ و میر برجسته می‌کند.

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Recovery of Consciousness and Rehabilitation in a Patient with Brain Tissue Herniation

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Abstract

Background: Cranioplasty (CP) after traumatic craniectomy is a neurosurgical procedure that aims to restore esthetics, improve cerebrospinal fluid (CSF) dynamics, and protect the brain. This report describes the management and treatment outcomes of a patient with a severe head injury from a traffic accident who was admitted to the hospital with a large irregular wound a parietal bone fracture and brain tissue protrusion.

Introduction: The patient was admitted to the hospital in shock and anesthesia after a traffic accident. Examinations revealed an irregular wound of approximately 10 cm in the parietal region of the head with brain tissue protrusion. With the stabilization of the general condition and normalization of vital signs, urgent surgical intervention was performed to control bleeding, prevent brain tissue blunting, and repair bone fractures. Also, subsequent surgeries were performed to correct the bone defect in the frontoparietal and supraorbital areas, which improved the patient's condition overall.

Conclusion: This report demonstrates the ability of local professionals to successfully manage patients with severe head injuries in Afghanistan, a country with limited access to health services due to prolonged conflict. Appropriate management, close monitoring, and appropriate surgery save patients' lives and lead to better clinical outcomes. This case highlights the importance of investing in domestic health infrastructure and the need to provide specialized services within the country to reduce disability and mortality.

Key words: Cerebral hemorrhage, Cranioplasty, Paralysis treatment.

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Introduction

Decompressive craniectomy (DC) is an effective treatment for alleviating intractable intracranial hypertension following severe traumatic brain injury (TBI). While most patients survive DC, many require subsequent cranioplasty (CP) to replace the original bone flap or utilize an artificial graft. However, the optimal timing for CP after DC remains unclear. Case series suggest that early cranioplasty is associated with higher infection rates, whereas delaying the procedure may increase the risk of bone resorption^[4].

This case report outlines the management and outcomes of a patient who sustained a severe head injury following a traumatic incident. The patient presented with a large, irregular wound in the parietal region, accompanied by brain tissue protrusion. Urgent surgical intervention was performed to manage the wound and control bleeding. Postoperatively, the patient exhibited limited movement on one side of the body but demonstrated improvement through medical treatment and physiotherapy. Additional surgeries were conducted to address fractures in the supraorbital region and a bone defect in the frontoparietal area. Overall, the patient's condition improved significantly, achieving satisfactory outcomes.

The timing of cranioplasty has been a subject of debate among neurosurgeons, with many questioning the traditional delayed approach (3–6 months after DC). Recent studies have explored the potential benefits of early cranial repair (1–3 months after DC), focusing on reducing complications and improving neurological outcomes^[5].

While decompressive craniectomy (DC) is often regarded as a relatively straightforward procedure with significant benefits for cerebral physiology, it is not without potential complications. Postoperative issues may include hemorrhage at the surgical site or more remote locations, such as contralateral epidural hematoma (EDH). Other complications include brain herniation through the craniectomy defect, surgical site infections, subdural hygroma (SDG), post-traumatic hydrocephalus (PTH), and the syndrome of the trephined, characterized by unexplained neurological deterioration following DC. Additionally, DC necessitates subsequent cranioplasty (CP), which introduces its own risks, such as postoperative hemorrhage, infection, and bone resorption. These complications may require further surgical interventions^[6].

Although cranioplasty (CP) is considered a relatively straightforward surgical procedure, it carries the risk of intraoperative complications at various stages, including elevation of the scalp flap, dissection of soft tissue from the underlying dura, and placement of a congruent rigid structure to fill the defect^[7].

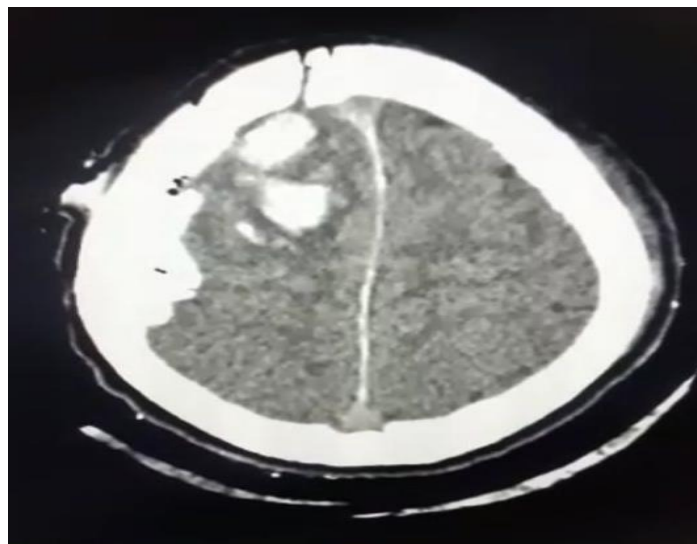


Figure 1- First brain CT scan showing initial injury

Case Report

This case report details the management and outcomes of a patient admitted to the hospital in shock and unconsciousness following a traumatic incident. On examination, 10 cm irregular wound was observed in the parietal region, with brain tissue protruding through the defect. The patient's pupils were reactive, but motor function in both the upper and lower extremities was absent.

After stabilization and obtaining informed consent, urgent surgical intervention was performed. The parietal wound was found to be extensive, with exposed and fractured bone, along with sinus bleeding, which was successfully controlled. Hemostasis was achieved through the evacuation of a hematoma in the exposed cortex, followed by physiological saline lavage. Expandable duraplasty was performed to protect the brain, and general hemostasis was secured. A drainage tube was inserted, and the wound was meticulously repaired. The surgery was successful, and the patient regained consciousness after one week in the ICU. However, limited movement on one side of the body (hemiparesis) was noted. Over the next 30 days, a combination of dual therapy and physiotherapy significantly improved the patient's mobility.

Subsequent imaging, including brain CT and 3D maxillofacial reconstruction, revealed mild cerebral edema and a fracture in the supraorbital region. Due to impaired eye movements, surgical fixation of the orbital roof was planned. Additionally, a defect in the frontoparietal area prompted the need for cranioplasty. On day 40, following consent, the previous incision was reopened, the skull defect was identified, and it was reconstructed using bone cement secured with screws. The orbital roof was repaired and stabilized using mini plates and screws. The wound was meticulously closed, and the second surgery was also successful^[8].

This case demonstrates the application of Greenberg MS guidelines for managing traumatic cranial injuries, including urgent hemostasis, duraplasty, defect reconstruction, and rehabilitation, resulting in significant recovery and functional improvement^[9].

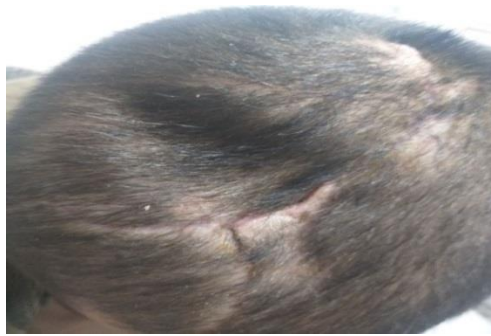


Figure 2- Bone defect after first surgery

Discussion

This case underscores the successful management of a severe head injury in a resource-constrained setting, such as Afghanistan, where ongoing conflict poses significant challenges to healthcare delivery. Historically, critically ill patients often required transfer abroad for advanced medical care. However, this report highlights that with appropriate management and the strategic utilization of available resources, high-quality care can be delivered locally.

The patient received intensive monitoring in the ICU without the use of a ventilator, a limitation that often complicates care in such settings. Despite the absence of advanced respiratory support, the patient demonstrated remarkable recovery, regaining motor function with no evidence of paralysis. This outcome emphasizes the critical role of meticulous patient management and adaptability in achieving favorable outcomes, even in environments with limited access to sophisticated medical technologies.

This case serves as a testament to the potential for resource-limited healthcare systems to provide effective care through the optimization of existing infrastructure and practices, highlighting the resilience and capability of local healthcare providers.



Figure 3- Bone defect observed during second operation

In this case, the patient was promptly transported to the hospital following a traumatic incident, despite the challenging circumstances. Upon admission, the surgical team promptly evaluated and managed the extensive parietal wound, which involved a complex combination of bone fracture and brain tissue protrusion. Hemostasis was effectively achieved, and meticulous wound closure was performed. Postoperative care included close monitoring in the intensive care unit, along with the implementation of targeted medical therapy and physiotherapy. These interventions collectively facilitated significant improvement in the patient's mobility, underscoring the effectiveness of timely and comprehensive multidisciplinary management in optimizing outcomes for severe head injuries.

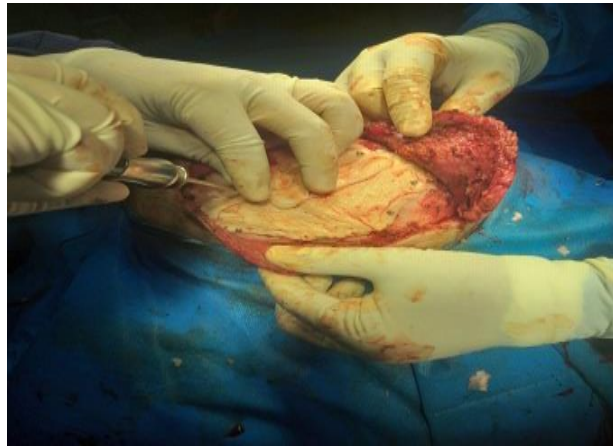


Figure 4- Bone cement graft

Subsequent surgical interventions to repair fractures in the supraorbital region and address a bone defect in the frontoparietal area were successfully performed within the same healthcare facility. These outcomes underscore the critical importance of having skilled medical professionals and adequate resources available locally to manage complex craniofacial injuries effectively ^[10].

The successful management of this patient within the country represents a notable advancement, alleviating the need for patients to seek treatment abroad and reducing associated logistical and financial burdens. This case underscores the value of investing in local healthcare infrastructure and the training of healthcare professionals to deliver specialized care in critical scenarios. The interventions were guided by evidence-based protocols outlined in Youmans and Winn Neurological Surgery textbook, ensuring the delivery of optimal care ^[11]. Adherence to these authoritative guidelines played a pivotal role in the patient's remarkable recovery, achieved despite the absence of ventilatory support. This highlights the critical role of established medical frameworks in managing complex cases, particularly in resource-constrained and challenging settings.

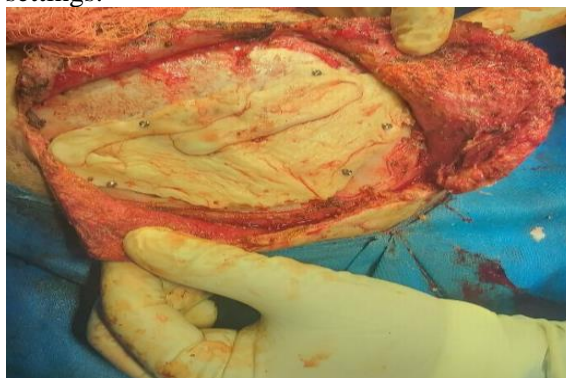


Figure 5- Bone cement graft post-procedure

Conclusion

In conclusion, we successfully stabilized the bone using bone cement and screws, achieving effective fixation. Despite the presence of brain herniation, the patient did not experience any permanent neurological deficits. Notably, the patient was managed without ventilatory support and achieved full recovery, successfully reintegrating into their community. This case highlights the effectiveness of our surgical approach and underscores the importance of comprehensive care in managing complex conditions, even in resource-limited settings.

Cranioplasty not only aids in structural reconstruction but may also enhance neurological function, with evidence suggesting that earlier cranioplasty could further improve these outcomes. However, the long-term effects of cranioplasty on neurological recovery require further investigation through prospective studies that evaluate comprehensive outcomes^[4].

Current evidence indicates no significant differences in postoperative overall complications or procedure-related infections between early and late cranioplasty in patients undergoing decompressive craniectomy (DC) for traumatic brain injury (TBI). However, early cranioplasty has been associated with a reduced risk of subdural effusion and shorter operating times. These findings underscore the need for large, randomized controlled trials to confirm the potential benefits and establish the optimal timing for cranioplasty^[12].

This case underscores the potential for achieving positive outcomes in the management of critically ill patients within Afghanistan, a country that has endured prolonged conflict and faced significant limitations in healthcare access. Historically, critically ill patients often needed to seek treatment abroad due to insufficient local resources. However, this case demonstrates that with adequate management, skilled professionals, and appropriate resources, effective care can be delivered locally, reducing the necessity for patients to travel abroad for specialized treatment.



Figure 6- End of second operation

The successful management of this patient with a severe head injury—including timely surgical intervention, comprehensive monitoring in the intensive care unit, and follow-up surgeries to address additional complications—highlights the expertise of local healthcare professionals and underscores the critical importance of investing in local healthcare infrastructure.

Providing specialized care locally enables critically ill patients to receive timely and appropriate treatment, alleviating the need for them and their families to seek medical care abroad. This approach not only saves lives but also enhances patient outcomes by ensuring continuous care and support within the local healthcare system^[13].

In conclusion, this case highlights the remarkable progress in managing critically ill patients within Afghanistan, even under challenging circumstances. It underscores the importance of strengthening local healthcare capacity and demonstrates the potential to deliver life-saving interventions, reducing the need for patients to seek treatment abroad^[14].



Figure 7: Postoperative recovery with complete cranioplasty and Skull without defect

Conflict of Interest

The authors of this case report, Khaja Jamil Ahmad Jami, a faculty member at Ghalib Medical University, and Barakatullah Mohammadi, a neurosurgeon at Herat Regional Hospital, affirm that the publication of this article in the Ghalib Medical Journal is grounded solely on scientific research. This study involves no financial interests, and the authors declare no financial or professional affiliations with any companies or organizations that could influence the study's findings.

The authors believe that addressing these disclosures reinforces the scientific integrity of the article and ensures the independence and objectivity of the analyses and conclusions presented.

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