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Multisystem Management in a Geriatric Patient with Intracerebral Hemorrhage, Acute Kidney Injury, Stenotrophomonas Maltophilia Pneumonia, and Paraphimosis: A Clinical Case Report

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Abstract

Introduction: Intracerebral hemorrhage (ICH) is a highly lethal neurological emergency in elderly patients, especially when associated with systemic complications such as acute kidney injury (AKI) and nosocomial infections caused by multidrug-resistant microorganisms. This report describes the clinical course and multidisciplinary management of an elderly patient with ICH who developed AKI superimposed on chronic kidney disease (CKD), pneumonia caused by *Stenotrophomonas maltophilia*, and paraphimosis.

Case Report: An elderly male patient with a history of arterial hypertension, type 2 diabetes mellitus, and visual impairment was admitted to the intensive care unit with decreased level of consciousness and sudden-onset aphasia. Computed tomography revealed ICH associated with ischemic stroke. During hospitalization, he developed AKI secondary to urinary obstruction due to paraphimosis, requiring emergency dialysis. *S. maltophilia* was isolated from tracheal aspirate, and targeted antibiotic therapy was initiated. Integrated management included ventilatory support, nephrological care, rational antibiotic use, and urological intervention. The patient showed clinical improvement, restoration of urine output, and was discharged with a structured home care plan.

Conclusion: Early, individualized, and interdisciplinary management was essential for the recovery of a geriatric patient with multiple simultaneous critical conditions. Identification of reversible causes, such as obstructive paraphimosis, and adequate control of hospital-acquired infection were crucial to achieving a favorable outcome.

Keywords: Intracerebral Hemorrhage, Acute Kidney Injury, Stenotrophomonas Maltophilia, Critical Care

1. Introduction

Intracerebral hemorrhage (ICH) represents the second most prevalent cause of stroke and stands among the most devastating neurological emergencies, with mortality rates reaching up to 50% within the first 30 days, particularly in elderly patients with multiple comorbidities or under oral anticoagulant therapy [1, 2]. Despite the severe nature of the condition, studies indicate that certain subgroups—such as elderly patients with lobar hemorrhages and limited hematoma expansion—may achieve favorable neurological outcomes when promptly submitted to intensive interventions and adequate multidisciplinary support [3].

In the context of acute stroke, particularly in cases of ICH, acute kidney injury (AKI) is a frequent complication, with an estimated prevalence ranging from 12% to 25%, and is considered an independent predictor of poor prognosis [4, 5, 8-10]. The occurrence of AKI in this clinical profile is associated with prolonged mechanical ventilation, increased length of stay in intensive care units (ICU), and lower rates of functional recovery. Factors such as systemic arterial hypertension, impaired baseline renal function, and high scores on the National Institutes of Health Stroke Scale (NIHSS) are widely recognized as predictors for the development of AKI in stroke patients [12, 13].

Additionally, attention must be given to the emergence of nosocomial infections caused by Stenotrophomonas maltophilia in intensive care settings. This opportunistic Gram-negative bacillus is intrinsically resistant to multiple antimicrobial classes and is commonly implicated in ventilator-associated pneumonia and bloodstream infections in critically ill patients, especially those exposed to prolonged broad-spectrum antibiotic therapy and invasive devices [6, 7, 14-19]. Mortality rates from this infection may exceed 50%, even under targeted therapeutic regimens, highlighting the complexity of its clinical management [16].

In parallel, paraphimosis represents a frequently underreported urological emergency in critical care. It is characterized by persistent retraction of the foreskin behind the glans penis, leading to venous obstruction, progressive edema, and an imminent risk of ischemia or necrosis of penile tissue. Its occurrence is generally associated with inadequate handling during procedures such as urinary catheterization or intimate hygiene in uncircumcised patients. However, it may also result from infectious, inflammatory, or traumatic processes, such as those observed in monkeypox infections, lichen sclerosus, or local mechanical injuries [20-23].

The concomitance of severe ICH, AKI superimposed on chronic kidney disease (CKD), nosocomial pneumonia due to S. maltophilia, and acute paraphimosis constitutes a rare and highly complex clinical scenario, demanding coordinated action from neurocritical care, nephrology, infectious diseases, and urology teams. Effective management of these multiple conditions requires an integrated diagnostic and therapeutic approach focused on hemodynamic stabilization, infection control, renal support, and timely urological intervention.

In this context, the present article aims to report and discuss the clinical case of an elderly patient affected by extensive ICH, S. maltophilia infection, dialysis-requiring AKI superimposed on CKD, and acute paraphimosis. The objective is to highlight the clinical and therapeutic challenges involved in the simultaneous management of these four potentially fatal conditions, as well as to reflect on effective multidisciplinary strategies for their management in the intensive care setting.

2. Case Report

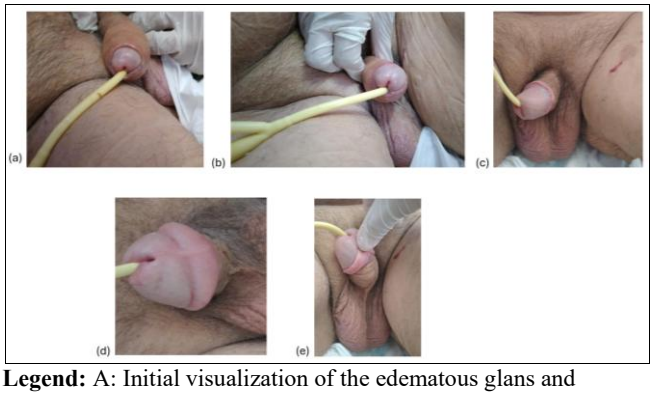
An elderly male patient, with a history of systemic arterial hypertension, type 2 diabetes mellitus, bilateral visual impairment, and stage 3B chronic kidney disease (CKD), was admitted to the Intensive Care Unit (ICU) on November 6, 2024, after being found unconscious at home with sudden-onset aphasia. At admission, he presented with a decreased level of consciousness (Glasgow Coma Scale score of 10), vomiting, tachycardia (110 bpm), oxygen desaturation (SpO_2 89% on room air), and absence of spontaneous respiratory effort, which led to orotracheal intubation. Cranial computed tomography (CT) demonstrated a right lobar intraparenchymal hematoma, with an estimated volume of 52 mL, associated with an adjacent ischemic infarction. The initial National Institutes of Health Stroke Scale (NIHSS) score was 17. During the hospital course, the patient underwent tracheostomy on the 13th day of hospitalization (metallic cannula no. 4) and remained under continuous intensive monitoring.

In the initial phase, empirical antimicrobial therapy was initiated with ceftriaxone, clindamycin, and piperacillin–tazobactam. Given clinical progression and suspicion of resistant pathogens, antibiotic therapy was escalated to meropenem, gentamicin, polymyxin B, and Targocid. Additionally, antiviral coverage with acyclovir (initiated on November 12) and antifungal therapy with fluconazole (maintained until December 10) were prescribed. On December 17, 2024, tracheal aspirate culture revealed *Stenotrophomonas maltophilia*, resistant to multiple previous regimens. At this point, targeted therapy with trimethoprim–sulfamethoxazole (15 mg/kg/day of trimethoprim) and levofloxacin (750 mg/day) was introduced, maintained for 14 days (December 27 to January 9). Following this intervention, the patient presented clinical improvement and hemodynamic stabilization, which allowed transfer to the ward on January 7, 2025.

The following day, however, he developed acute respiratory distress characterized by tachypnea (30 breaths per minute), expiratory wheezing, profuse diaphoresis, and oxygen desaturation despite supplemental oxygen through tracheostomy. ECG revealed sinus tachycardia (105 bpm), and pulmonary auscultation demonstrated globally diminished vesicular breath sounds. The hypotheses of bronchospasm or bronchoaspiration were raised, and inhaled salbutamol associated with increased oxygen flow was prescribed. Due to clinical instability, the patient was readmitted to the ICU for close monitoring and respiratory support.

During the subsequent course, the patient developed progressive renal dysfunction, initially manifested by oliguria with a urine output of 475 mL/24h on February 8 and 875 mL/24h on February 9, associated with rising urea and creatinine levels and refractory hyperkalemia. These findings were consistent with acute kidney injury (AKI) KDIGO stage III, superimposed on chronic kidney disease. Hemodialysis was indicated, and a double-lumen dialysis catheter was inserted on February 9.

On the same date, during routine physical examination, urological complications were observed. The patient presented with paraphimosis (figure 1), characterized by significant edema of the glans penis and a phimotic ring causing constriction. Manual reduction was successfully performed, resulting in rapid clinical improvement and substantial increase in urine output (more than 10,000 mL in 24 hours following the procedure). Preventive measures were reinforced with the nursing staff, emphasizing the need to reposition the foreskin over the glans after hygiene procedures or catheter care, to avoid recurrence of paraphimosis.



Legend: A: Initial visualization of the edematous glans and preputial retraction. B: Evidence of a constrictive ring and signs of distal ischemia with urinary catheter in place. C: Gentle manipulation for assessment and initiation of compression. D: Digital compression with moistened gauze, progressive reduction of edema. E: Post-manual reduction of paraphimosis with evident improvement in penile coloration and vascularization.

Fig 1: Clinical aspects of paraphimosis in a hospitalized elderly patient

After stabilization, the patient was discharged from the ICU on February 12, 2025. At this time, he was hemodynamically stable, without vasopressor support, and presented improved neurological responsiveness, although maintaining residual deficits. Renal function progressively

recovered, and dialysis was discontinued. The infectious condition remained under control, with no evidence of ongoing systemic infection. On March 14, 2025, after a prolonged hospitalization, the patient achieved sufficient clinical and laboratory stability to be discharged home. Multidisciplinary follow-up was recommended, including neurology, nephrology, infectious diseases, urology, physiotherapy, nutrition, and speech therapy.

3. Discussion

Intracerebral hemorrhage (ICH) is among the most devastating acute neurological events, with mortality rates surpassing 40% in the first month, particularly in elderly patients with multimorbidity. Anticoagulant exposure represents a major determinant of poor prognosis, as evidenced by Fernando *et al*. [1], who identified significant correlations between anticoagulation, hematoma expansion, and early mortality. Although this patient did not present active anticoagulation, his advanced age, chronic kidney disease (CKD), and hypertension contributed to substantial baseline vulnerability. Nevertheless, the lobar location of the hematoma and the absence of expansion — variables associated with improved outcomes [3] — likely favored survival. Derex and Rheims [2] further demonstrated that seizures, when promptly managed, do not invariably worsen prognosis, and the absence of convulsive activity in this case eliminated an additional source of neurological insult.

From a pathophysiological standpoint, the intersection between brain injury and systemic dysfunction is of particular relevance. Stroke triggers a cascade of inflammatory and neurohumoral responses, including sympathetic hyperactivation, endothelial dysfunction, and cytokine release, which directly contribute to multi-organ injury. The kidneys are especially susceptible: cerebral ischemia and hemorrhage may precipitate renal hypoperfusion and tubular necrosis, potentiated by nephrotoxic drugs and sepsis. The patient's evolution with KDIGO stage III acute kidney injury (AKI), requiring renal replacement therapy, is consistent with the 12–25% prevalence described by Naveed *et al*. [4]. Importantly, Huang *et al*. [5] and Gadalean *et al*. [9] demonstrated that even mild AKI after stroke increases long-term mortality, confirming its role as both a marker of systemic severity and an independent prognostic factor.

The infectious complication by *Stenotrophomonas maltophilia* deserves special consideration. This opportunistic Gram-negative bacillus has emerged as a significant ICU pathogen due to intrinsic resistance to carbapenems and multiple antimicrobial classes. Hong *et al*. [6] reported mortality rates exceeding 50% in ventilator-associated pneumonia caused by this organism. In the present case, several predisposing factors coexisted: prolonged mechanical ventilation, repeated exposure to broad-spectrum antibiotics, and underlying renal dysfunction, in line with predictors described by Park *et al*. [7] and Li *et al*. [17]. Moreover, the selection pressure exerted by empirical carbapenem therapy is consistent with the resistance mechanisms outlined by Gales *et al*. [14] and Wang *et al*. [18]. Once isolated, the pathogen required targeted therapy, and the choice of trimethoprim–sulfamethoxazole combined with levofloxacin was supported by Cortes *et al*. [16], who demonstrated the efficacy of this regimen in severe infections. Timely initiation of adequate therapy, emphasized by Md *et al*. [19], was crucial to the patient's improvement.

The occurrence of paraphimosis in a critical care setting illustrates how local complications may precipitate systemic deterioration. Although often underestimated, paraphimosis represents a urological emergency capable of inducing venous congestion, ischemia, and, in advanced stages, necrosis of the glans penis. Its etiology in hospitalized patients is predominantly iatrogenic, associated with improper handling during catheterization or neglect in foreskin repositioning [22, 24]. In this case, paraphimosis precipitated post-renal obstruction, anuria, and refractory hyperkalemia, leading to urgent dialysis. The dramatic recovery of renal function following manual reduction, with diuresis exceeding 10,000 mL/24h, highlights the reversibility of the insult when promptly identified. This finding supports the observations of Tremayne *et al*. [24], who emphasized preventive measures such as routine inspection and appropriate hygiene. In patients with recurrent events or limited mobility, circumcision remains a definitive and safe intervention [25].

The simultaneity of ICH, severe AKI, multidrug-resistant infection, and paraphimosis underscores the complexity of managing critically ill elderly patients. Each of these conditions alone carries high mortality; their overlap demands integration of expertise from neurology, nephrology, infectious diseases, and urology. The importance of multidisciplinary care is reinforced by Biancardi *et al*. [12], who demonstrated improved outcomes with integrated renal and neurological monitoring, and by Zorrilla-Vaca *et al*. [13], who linked AKI in stroke to increased incidence of sepsis, prolonged ventilation, and poor neurological recovery.

This case also raises broader considerations regarding antimicrobial stewardship and iatrogenic complication prevention. The sequential use of multiple broad-spectrum agents, while initially justified by clinical severity, undoubtedly contributed to resistance selection. Strategies such as early microbiological sampling, de-escalation protocols, and antibiotic restriction policies are fundamental to reduce the burden of multidrug-resistant pathogens in ICUs. Similarly, simple preventive measures — such as foreskin repositioning after catheterization — are low-cost interventions capable of preventing severe complications like paraphimosis, which in this case directly contributed to renal deterioration.

4. Conclusion

The present case highlights the multifactorial challenges inherent to the management of critically ill elderly patients with overlapping neurological, renal, infectious, and urological complications. The coexistence of intracerebral hemorrhage, dialysis-requiring acute kidney injury on chronic kidney disease, ventilator-associated pneumonia due to multidrug-resistant *Stenotrophomonas maltophilia*, and acute paraphimosis delineates a rare and highly complex clinical scenario. The favorable outcome observed underscores the decisive role of early recognition of complications, individualized therapeutic adjustments, and the integration of multidisciplinary expertise in neurocritical care.

This report reinforces that evidence-based decision-making, rational antimicrobial stewardship, and prompt urological intervention are fundamental pillars for reducing morbidity and mortality in intensive care units. Even in scenarios

characterized by extreme clinical severity and multiple organ dysfunction, coordinated interdisciplinary management can enable functional recovery and safe hospital discharge, thus demonstrate the potential reversibility of otherwise life-threatening conditions when approached systematically and proactively.

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