



Review Article

Proposal for Optimizing Urological Services during Wartime

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Introduction

Wars and conflicts continue to have significant impacts on populations around the world. Still it is a tumultuous period that significantly impacts the physical and mental well-being of individuals and. Among the challenges brought about by wars are medical emergencies that require urgent care, the field of urology presents unique challenges for healthcare providers. urology plays a crucial role in managing genitourinary conditions resulting from combat-related injuries [1]. Limited resources, inadequate surgical facilities, and high patient volumes further complicate the provision of urological care during times of war. Additionally, the psychological stress experienced by both healthcare providers and patients can have a profound impact on the quality of care delivered [2]. This article aims to explore the challenges faced by urologists on the battlefield and highlight the innovations and advancements in urological care that have emerged as a result. Domestically, GUIs comprise a low percentage of traumatic injuries (2%) and are most likely associated with traffic accidents or sporting items in younger patients, while in older patients, GUIs are commonly associated with falls [3,4]. While the mechanism of battle-related GUIs is commonly improvised explosive devices or blasts, blunt trauma with injuries of the kidney predominates domestically [5,6]. Furthermore, in the treatment of domestic GUIs, organ salvage has become common due to advantages in imaging and minimally invasive techniques, and there are established guidelines for treating GUIs [7]. In contrast, there are no established guidelines for treating battle-related GUIs, but a few studies have pointed out the importance of wound debridement and reconstructive surgery [8,9]. This paper aims to propose guidelines for urology in times of war.

The Main Objectives

The main objective of urological services during war is to reduce mortality and morbidity. To achieve this goal, the following key priorities should be agreed upon:

- Provide life-saving emergency and semi-emergency care to patients with acute urological problems in the context of war or conflict.
- Use available resources in the most effective and efficient way to ensure that patients receive the best possible care.
- Ensure that staff are well-equipped, well-trained, and appropriately supported to deliver high-quality urological care in difficult circumstances.
- Improve the overall state of urological health and hygiene in the affected communities.

Prerequisites in Terms of Infrastructure, Devices, Consumables, and Personnel

The provision of effective urological services during times of war requires a range of infrastructure, devices, consumables and personnel. Key prerequisites include:

- Adequate infrastructure and facilities to provide emergency and semi-emergency urological care.
- Access to essential diagnostic and therapeutic devices, including ultrasound machines, rigid or flexible cystoscopes, laparoscopic equipment, stents, catheters, and drainage systems.
- Adequate stocks of consumables, including catheters, stents, sutures, and other consumables that may be needed during emergency procedures.

- Sufficient numbers of appropriately trained and skilled personnel. This includes urologists, anesthetists, medical officers, nurses, and other healthcare workers who are familiar with emergency urological procedures.

Plan for Selection of Priority Cases in Urology During Times of War

Objective: To establish a systematic approach for selecting priority cases in urology during times of war, ensuring optimum utilization of limited resources and providing the best possible care to patients.

- 1) **Establish a triage system:** Develop a well-defined triage system for urologic cases, considering urgency, severity, available resources, and potential impact on the overall wartime healthcare system.
- 2) **Define prioritization criteria:** Determine clear criteria for prioritizing urologic cases, based on the following factors:
 - a. **Urgency:** Identify cases requiring immediate intervention to save lives or reduce long-term sequelae.
 - b. **Resource availability:** Consider the availability of personnel, surgical facilities, equipment, and supplies necessary for each case.
 - c. **Prognosis:** Assess the potential for successful outcomes and post-war quality of life.
 - d. **Military significance:** Take into account the impact of each case on the readiness and operational effectiveness of military personnel.
- 3) **Establish a dedicated urology team:** Establish a specialized urology team comprising urologists, nurses, technicians, and support staff with experience in wartime settings. This team should have a thorough understanding of the triage system and be capable of rapid decision-making.
- 4) **Communication and coordination:** Ensure effective communication and coordination with other medical units and decision-making authorities to allocate resources appropriately and exchange critical information about each case's priority level.
- 5) **Training and education:** Provide training sessions and refresher courses for military medical personnel involved in the urologic care process. This should include identification of priority cases, initial stabilization, and appropriate documentation for efficient decision-making.
- 6) **Regular reassessment:** Continuously reassess the triage system and update the prioritization criteria based on evolving

circumstances, changes in available resources, and emerging medical advancements.

- 7) **Ethical considerations:** Ensure adherence to ethical principles when making priority decisions, considering fairness, transparency, and respect for human rights.
- 8) **Information management:** Implement a comprehensive information management system to track urologic cases, their priorities, treatment progress, and outcomes. This information can be valuable for future analysis, research, and continuous improvement of the triage system.
- 9) **Research and shared knowledge:** Encourage research initiatives to study the unique challenges and experiences related to urologic care during times of war. Share findings with the medical community to enhance preparedness and response in similar situations.

By implementing this plan, the selection of priority cases in urology during times of war can be conducted in a fair, efficient, and effective manner, ensuring the limited resources are utilized appropriately to provide the best possible care to patients.

Triage of Emergency and Semi-Emergencies in Urology

Triage is a critical component of effective emergency medical care for urological patients in times of war or conflict. It is important to prioritize the medical needs of patients in order to maximize the chances of survival. To prioritize the needs of patients, a triage system should be established based on objective criteria. When triaging patients, the following factors should be considered:

- Severity of injury or illness: Patients with life-threatening injuries or illnesses should be given priority.
- Time since injury or illness: Patients who have recently suffered an injury or illness requiring urological consultation may need urgent attention.
- Vital signs: Patients with unstable vital signs need immediate attention.

Plan for Priority and Action Plan

A plan for priority should be established to help ensure that urological care is provided in an appropriate order of urgency. This plan should be based on a series of pre-established criteria that prioritize the severity of a patient's urological condition. An action plan should be developed that outlines the steps that need to be taken to provide the necessary care to patients. This plan should be easily accessible and understandable by all staff involved in the provision of emergency and semi-emergency urological care.

Hospital Management

In times of war or conflict, adequate hospital management is critical to the effective provision of urological care. The following key principles should be followed:

- Establish effective communication channels between medical personnel to facilitate the coordination of urological care.
- Maintain open channels of communication between hospital personnel and local government and military authorities.
- Ensure adequate stocks of essential medical supplies and pharmaceuticals, as well as adequate staffing levels.
- Ensure the availability of appropriate equipment and medical devices.
- Establish and maintain appropriate systems for the sterilization and storage of medical equipment.

Urological Consumables Checklist During War

During times of war or conflict, the provision of adequate medical care becomes crucial. Urological conditions and injuries are not uncommon in such situations, and having the necessary consumables readily available is essential for effective treatment. To ensure a smooth and efficient urological care system, consider the following checklist of essential urological consumables during war:

1) Catheters

- Indwelling Foley catheters in various sizes (12Fr, 14Fr, 16Fr) for urinary drainage in patients with urinary retention or after surgical procedures.
- External catheters (condom catheters) for male patients who are unable to use or tolerate indwelling catheters.
- Intermittent catheters for patients with neurogenic bladder or those unable to empty their bladder spontaneously.

2) Urinary Bags

- Leg bags for mobile patients, allowing urine collection while providing freedom of movement.
- Bedside drainage bags for patients who are bedridden or unable to move.
- Urine meter bags with calibrated measurement for accurate monitoring of urine output.

3) Urological Drains

- Nephrostomy tubes for emergency drainage of the kidneys in cases of obstructed urinary flow or trauma.

- Penrose drains for open surgical drainage of abscesses or fluid collections within the urinary system.

- Suprapubic cystostomy tubes for bladder drainage in patients with urethral injuries or urinary tract obstructions.

4) Urethral Dilators

- Urethral dilators of varying sizes for gradual dilation of the urethra and management of urethral strictures caused by trauma or infection.

5) Fluid Irrigation Sets

- Irrigation sets with appropriate tubing and solution for bladder irrigation, useful in managing traumatic hematuria, clot retention, or urinary tract infections.

6) Urological Sutures and Staples

- Non-absorbable sutures for repairing urinary tract injuries, such as bladder or ureteral lacerations.
- Skin staples for closing wounds in urological surgery or trauma cases.

7) Hemostatic Agents

- Hemostatic agents like absorbable gelatin sponges or oxidized regenerated cellulose for controlling bleeding during urological surgeries or managing trauma-related injuries.

8) Urological Stents

- Ureteral stents for temporary or permanent relief of urinary obstruction caused by injury, tumors, or urological procedures.
- Urethral stents for managing strictures or obstruction in the male urethra.

9) Ureteral Access Sheaths

- Ureteral access sheaths for safe and efficient access to the urinary tract during endourological procedures, such as ureteroscopy or stone removal.

10) Urological Instruments

- Basic urological instruments like urethral sounds, cystoscopes, resectoscopes, and ureteroscopes for diagnostic and therapeutic purposes.
- Stone retrieval baskets, forceps, and lithotripsy devices for managing urinary tract calculi.

11) Urine Testing Kits

- Urine testing strips for rapid bedside evaluation of urinary tract infections, hematuria, proteinuria, or kidney function.

12) Antibiotics and Antiseptics

- Broad-spectrum antibiotics for treating urinary tract infections and preventing sepsis.
- Antiseptic solutions for cleansing wounds, perineal hygiene, and reducing infection risks during urological procedures.

Proper and organized stock management of these urological consumables is crucial during war or conflict. Regular inventory checks, replenishment, dissemination of guidelines, and training of medical personnel on their appropriate use are also essential aspects to consider. These consumables will aid in providing adequate urological care during wartime situations and optimizing patient outcomes.

Staff Care

The provision of urological care during times of war can be highly challenging, both physically and emotionally. It is essential to ensure that staff are well-equipped and supported to manage the psychological and physical challenges that they are likely to encounter.

To Support Staff, it is Important to

Hosting the displaced urologists with provision of welcoming behavior, accommodation, place of work and helping them to finance themselves.

- Provide appropriate training and support to staff, including training in trauma care and psychological support.
- Ensure that the physical environment in which staff work is supportive, comfortable, and accessible.
- Provide adequate rest time and appropriate levels of supervision and support.
- Establish appropriate systems for managing the psychosocial aspects of patient care.

Priority of Urological Conditions for Intervention During War Time

During times of war, when medical resources may be limited, it is crucial to prioritize the intervention and treatment of urological conditions based on their severity and potential impact on the patient's health and well-being. The following list outlines the priority of urological conditions for intervention during war time:

- 1) **Life-Threatening Urological Injuries:** Any urological injuries causing life-threatening conditions, such as severe hemorrhage, organ rupture, or kidney or bladder trauma, should be given the highest priority. Immediate intervention,

including surgical repair or emergency procedures like nephrectomy, cystotomy, or vessel ligation, is essential to stabilize the patient and prevent further complications.

- 2) **Urinary Retention and Obstruction:** Patients with acute urinary retention or obstruction necessitate timely intervention to relieve their distress and prevent potential complications. Urgent catheterization or placement of a suprapubic cystostomy tube should be performed to restore urinary outflow and prevent kidney damage or infection.
- 3) **Genitourinary Infections and Sepsis:** Urological infections, such as pyelonephritis or urosepsis, require prompt intervention to prevent septic shock and systemic organ dysfunction. Administering appropriate antibiotics and initiating adequate urological drainage, such as nephrostomy tube placement or drainage of abscesses, is crucial in managing these conditions.
- 4) **Urological Trauma:** Urological trauma, including bladder or ureteral injuries, should be addressed promptly to prevent complications like urinary leakage, urinoma formation, or infection. Immediate surgical repair or intervention using stents, catheters, or drains is necessary to restore normal urinary function and minimize long-term sequelae.
- 5) **Urolithiasis:** Though not immediately life-threatening, urolithiasis (kidney stones) can cause severe pain, urinary tract obstruction, and subsequent infection. Swift intervention is required to provide pain relief and prevent complications. Options for intervention range from medical management with pain control and stone passage facilitation to endourological procedures like lithotripsy or ureteroscopy for stone removal.
- 6) **Urethral Strictures:** Urethral strictures can significantly impact bladder emptying, leading to urinary retention and recurrent infections. Early intervention, such as placement of a urethral stent or dilation, is crucial to restore urethral patency and prevent long-term complications.
- 7) **Non-life-threatening Urological Infections:** Non-severe urinary tract infections, such as uncomplicated cystitis, should be addressed through antibiotic therapy and supportive measures, considering the availability of resources and the severity of the infection. However, if left untreated, these infections can progress and lead to more severe complications.

It is important to note that this list is a general guideline and clinical judgment should be applied to address individual patient needs and the available resources during war time. Prioritizing interventions based on urgency, potential for complications, and impact on overall patient health will aid in optimizing urological care in challenging circumstances.

Managing the Budget of A Urological Hospital During Times of War

This can be a complex task due to limited resources, increased demand for medical services, and potential disruptions in supply chains. To effectively manage the budget in such challenging circumstances, the following strategies can be implemented:

- 1) **Prioritize Essential Services:** Identify and prioritize essential urological services that are critical for patient care and outcomes. These may include urgent surgical procedures, interventions for life-threatening conditions, and essential medications. Allocate a significant portion of the budget to these priority areas, ensuring that resources are allocated where they are most needed.
- 2) **Resource Optimization:** Optimize resource utilization by minimizing waste and ensuring efficient use of available supplies, equipment, and manpower. Implement strategies such as inventory management systems, tracking usage patterns, and adopting evidence-based utilization protocols to prevent unnecessary spending.
- 3) **Collaboration and Partnerships:** Foster collaboration with other healthcare institutions, NGOs, and relief organizations to share resources, expertise, and the financial burden. This can include joint procurement initiatives, shared staffing arrangements, or leveraging external funding sources to supplement the budget.
- 4) **Streamline Administrative Functions:** Review administrative processes to identify areas for improvement and streamline operations. Simplify documentation, automate billing processes where possible, and explore cost-saving measures such as bulk purchasing, negotiating favorable contracts, and finding alternative suppliers.
- 5) **Training and Skill Development:** Invest in training and skill development programs for healthcare providers to enhance their proficiency in managing urological conditions with limited resources. This may involve workshops, hands-on training, and educational programs focused on innovative techniques, resource optimization, and adapting to a war-time healthcare setting.
- 6) **Monitoring and Evaluation:** Implement a rigorous monitoring and evaluation system to assess the effectiveness of budget utilization and identify areas for improvement. Regularly track expenditures, patient outcomes, and resource utilization to make informed decisions and adjust priorities accordingly.
- 7) **Patient Support and Advocacy:** Emphasize patient education and self-management to empower patients to

actively participate in their care. This can reduce unnecessary hospital visits and lower healthcare costs. Additionally, consider establishing patient support groups or partnerships to provide assistance for medical expenses to those in need.

- 8) **Continuity of Care:** Emphasize the importance of preventive measures, early intervention, and follow-up care. By proactively managing urological conditions before they escalate, the burden on the healthcare system can be reduced. This includes promoting awareness about urological health, encouraging regular check-ups, and implementing strategies for timely intervention and monitoring.
- 9) **Contingency Planning:** Develop contingency plans for potential disruptions in supply chains, staff availability, and other unforeseen circumstances. This includes stockpiling essential medications and supplies, cross-training healthcare providers to handle multiple roles, and establishing alternative communication channels to ensure continuity of care.
- 10) **Advocacy for Resources:** Engage in advocacy efforts at local, regional, and national levels to secure additional funding and support for the urological hospital. Highlight the importance of maintaining urological services during war time and communicate the specific needs and challenges faced by the healthcare facility to relevant authorities. Managing the budget of a urological hospital during war requires careful planning, resource optimization, collaboration, efficient administration, and a patient-centered approach. By prioritizing essential services, streamlining operations, and advocating for support, it is possible to mitigate challenges and ensure effective allocation of limited resources while providing optimal urological care to those in need.
- 11) **Continuous Training and Education**
 - a. **Surgeon Training:** Offering specialized training programs for urologists in conflict zones can enhance their skills in managing urological trauma cases, resulting in better outcomes.
 - b. **Medical Staff Education:** Educating medical personnel outside the urological domain, such as emergency physicians and nurses, about basic urological procedures and interventions can bridge the gaps and bolster the overall urological care during wartime.
 - c. **training of the urology program residences is a pillar of concern during war time least they fall lagging off their competencies , the slots of training posts should be expanded to embrace the large number of residences to the capacity of training sites,**
 - d. **the accountability and the professionalism should be ascertained in the midst of meager resources , lack of salaries and shortage of stipend.**

Conclusion

The provision of urological services during times of war requires a range of infrastructure, devices, consumables, and personnel. It is essential to establish an appropriate triage system, plan for priority, action plan, hospital management and staff care. These guidelines will help to ensure the effective provision of urological care during times of war or conflict, and can be adapted to meet the needs of different contexts around the world.

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