

## BRIEF REPORT

# Syrian field hospitals: A creative solution in urban military conflict combat in Syria

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## Access this article online

Website: [www.avicennajmed.com](http://www.avicennajmed.com)

DOI: 10.4103/2231-0770.118467

## Quick Response Code:



## ABSTRACT

Since the war started in Syria nearly two years ago several independent organizations reported the use of medicine as a weapon by the Syrian authorities, killing of doctors and arresting patients who were admitted to the hospitals for treatment. In year 2012 the World Health Organization (WHO) found nearly 50% of hospitals are not functioning due to lack of staff, equipment and medicine. This report highlights how the doctors in Syria are creative and courageous to risk their own lives to save thousands of innocent lives.

**Key words:** Field hospital, combat medicine, Syria, war medicine

Combat or battlefield medicine is a branch of medicine that deals with treating wounded soldiers and medical management during combat, including first aid in the field, triage, fluid resuscitation, evacuation, transportation, damage control surgery, and site of surgical intervention.

Conventionally, wounded soldiers are treated in field hospitals (FHs). FHs are classified from levels 1 to 4 based on the proximity to the battlefield, the level of medical staff, the types and availability of supplies and equipment, the complexity of surgical interventions, and the presence of certain specialty surgeries and ancillary services. In an urban setting, FH is established in an easily accessible and clearly marked high building.

According to Geneva Convention, fighting parties are prohibited from attacking doctors, ambulances, hospitals, or FHs displaying a Red Cross or Red Crescent emblems; such targeting is considered a war crime.

Military operations in urban areas and conflicts between armies and armed resistance have complicated the care of wounded civilians and soldiers.

The ongoing armed conflict in Syria has entered its 3<sup>rd</sup> year unabated. According to the UN reports in June 2013, more

than 90,000 people were killed, more than 1.5 million became refugees in neighboring countries, 4.25 million were internally displaced, and hundreds of thousands were injured due to direct gunfire, shelling, bombing, crush injuries, burning, and explosions.<sup>[1]</sup>

The Syrian conflict created many unique challenges to doctors, medics, the wounded victims, and to the NGOs trying to help doctors save lives.

In year 2012 the World Health Organization (WHO) completed a rapid assessment of affected areas in Syria and found only 50% of hospitals to be fully functioning due to destruction and lack of staff, equipment, and medicine.<sup>[2,3]</sup> Many human rights organizations reported systematic targeting of doctors by authorities because they are treating wounded demonstrators or combatants. There were reports of patients tortured inside public and private hospitals, some were killed and some were pulled from the operating rooms and intensive care units (ICUs) by infamous and brutal security agents.<sup>[4]</sup>

Due to the fear of arrest by Syrian doctors and wounded patients and the lack of access to public hospitals, there was a need to develop a network of underground FHs in conflict

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areas to provide basic trauma care and damage control surgery to save lives.<sup>[5]</sup> Syrian Field Hospitals were established in hidden places like basements, farm houses, deserted buildings, Mosques, churches, and factories. Initially, they were poorly equipped, but gradually became sophisticated after 2 years of experience. They provided much needed surgical care to tens of thousands of wounded civilians and combatants. They also occasionally served as emergency room, multispecialty clinics, and even birth center to the local population deprived from healthcare access due to destruction of local hospitals and outpatient clinic and unsafe transportation due to the siege and military operations. Many of FHs were targeted and destroyed by the Syrian army.

Since its early prototypes in June 2011 in Irbin (Rief Damascus), Homs and JabalAlzaweya (Idlib), about 200 (level 2) FHs and thousands of (level 1) emergency points were established throughout Syria by medical relief organizations like Doctors Without Borders (MSF), the Syrian American Medical Society (SAMS), and other NGOs. Local doctors provided location and space, staffing, leadership, coordination, medical and surgical care, and reporting, while the supporting relief organizations provided funding, medical supplies purchased locally or transported secretly from across borders, medical equipment, training of doctors, and occasionally volunteer physicians.

Level I emergency point provided basic life support and wound care by medic or nurse, while a team of 4-9 medical staff, including 1-2 surgeons, surgical assistant, anesthesiologist, and nurses performed life saving surgeries at level 2 FH, including surgeries to control peripheral or internal bleeding from gunshot wounds or shrapnel, fractures, extraction of shrapnel, amputations, damage control abdominal surgeries, and burn care. More complicated surgeries were either done secretly in local hospitals or transported under extreme and dangerous conditions to the neighboring countries, often to Turkey, Lebanon, and Jordan. Often carried on backs or on donkeys, many traumatized patients succumbed to their traumas or sustained irreversible injuries during torturous and long trips because of bleeding, primitive stretchers, and blocked roads or border crossings.

In spite of operating often under fire and constant threat of shelling in austere environments using basic equipments [Table 1] without electricity, lights, diesel fuel, heating, blood transfusion, and basic labs, it is estimated that more than 270,000 patient's lives were saved by the Syrian Field Hospitals since the beginning of the conflict. Without electricity or diesel fuel for generators, Syrian surgeons used flash lights [Figure 1] and cell phones instead

**Table 1: Medical equipment and supplies for a field hospital**

Description	Quantity
Portable ventilator	2
Cautery 400 watt	2
Portable suction devise 90 L/M	2
Hot air sterilizer 85 L	1
O <sub>2</sub> generator machine	1
Portable X-ray device with accessories	1
Monitor	2
Defibrillator	2
Pulse oximeter	3
Abdominal surgical set	3
Minor surgery set	4
Orthopedic set	2
Ambu bag	3
Laryngoscope	2
Blood pressure device	4
Stethoscope	4
Oxygen container	4
Head light for surgery	4
Generator	1
OR table	1
OR light	1

OR: Operating room



**Figure 1:** A field hospital in Syria depicting how Syrian surgeons use flash lights in the operating room to save lives due to the lack of electricity and fuel

of surgical lights. Nurses used body heat to warm intravenous fluid before transfusing them to patients during and post surgeries. Anesthesiologists used intravenous sedation for major surgeries and old-style, hand-operated Ambu bag ventilation during and after surgeries. Tens of thousands of lives were saved, however it did not come without a price. It is estimated by Doctors Without Borders that at least 120 Syrian doctors, 65 medical aids, and 50 nurses have been killed and more than 469 doctors have been detained.<sup>[6]</sup> Thousands of patients lost their lives because they had no access to simple life-saving measures, while some of them bled to death.

Syrian doctors used creative and heroic measures to save their patients' lives by risking their own lives. They build

an impressive innovative underground system to deliver surgical and medical care in the setting of brutal urban military conflict. We owe it to these heroes to show our support and appreciation. They are doing God's work in the present day Syria.

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**Cite this article as:** Sankari A, Atassi B, Sahloul MZ. Syrian field hospitals: A creative solution in urban military conflict combat in Syria. *Avicenna J Med* 2013;3:84-6.

**Source of Support:** Nil, **Conflict of Interest:** None declared.

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