



Surgical challenges in a new theater of modern warfare: The French role 2 in Gao, Mali



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ABSTRACT

Introduction: On January 11th 2013, France launched Operation Serval in Mali following Resolution 2085 of the Security Council of the United Nations. Between January and March 2013, more than 4000 French soldiers were deployed to support the Malian National Army and the African Armed Forces. **Methods:** All of the patients who had surgery during Operation Serval were entered into a computerised database. Patients' demographic data (age, sex, status) and types of performed surgical procedures (specialties, injury mechanisms) were recorded.

Results: 268 patients were operated on in Gao's Role 2 with a total of 296 surgeries. Among those operated on, 40% were Malian civilians, 24% were French soldiers, and 36% were soldiers of the International Coalition Forces. The majority of the surgeries were orthopaedic, and visceral surgeries were common as well, representing 43% of the total surgeries. Specialised surgical procedures including neurosurgery, thoracic, and vascular surgery were also performed. Forty percent of the surgeries were scheduled. War-related traumatic surgeries represented 22% of the surgical procedures, with non-war related surgeries and non-trauma emergency surgeries making up the rest.

Conclusion: this analysis confirms the specific characteristic of asymmetric warfare that it results in a relatively reduced number of war-related casualties. Forward surgical teams have to deal with a wide range of injuries requiring several surgical specialties. Surgeries dedicated to medical aid provided to the population also represented an important part of the surgical activity. Because of the diversity and the technicality of the surgical procedures in Role 2, surgeons had to be trained in war surgery covering all of the surgical specialties, while they maintained their specific skills. In France in 2007, the French Military Health Service Academy (École du Val-de-Grâce, Paris, France) offered an advanced course in surgery for deployment in combat zones, with a special focus on damage control surgeries and the management of mass casualties incidents.

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Introduction

On January 11, 2013, France launched Operation Serval in Mali, following Resolution 2085 of the Security Council of the United

Nations. Between January and March 2013, more than 4000 French soldiers were deployed to support the Malian National Army and the African Forces of the African-led International Support Mission to Mali (AFISMA). Later, following the passage of Resolution 2100 of the Security Council of the United Nations on April 25th 2013, the troops also supported the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA). Previously, Operation "Iraqi Freedom" in Iraq and Operation "Enduring Freedom" in Afghanistan revealed new epidemiological data on combat casualty care statistics during non-conventional

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and asymmetric modern warfare [1–4]. Since there are no epidemiological data regarding the recent African theaters of operations, the aim of this study was to describe the surgical activity of a French Role 2 positioned in Gao (north of Mali) for 18 months (February 2013 to August 2014) and to compare it with the activity of Role 2s in Iraq and Afghanistan.

Methods

During Operation Serval, the French Military Health Service followed the doctrine it established for that purpose [5], along with NATO recommendations that define the different levels of care for combat casualties [6,7].

The French Role 2 is a small mobile surgical structure that is set up as soon as more than 1000 soldiers are deployed. It has three tents: one tent to admit the casualties, that has three dedicated intensive care beds; one tent with an operating room; and one hospitalisation tent with eight beds that requires a plot of land measuring at least 9 m × 36 m.

A Role 2 is fully equipped to be able to perform 12 surgical procedures over a period of 48 h. Afterwards, Role 2 has to be supplied by a pharmacy, generally located nearby. Materials in the Role 2 are designed for emergency diagnostic procedures (a mobile digital X-ray machine, a portable ultrasound machine, and a mini laboratory allowing limited blood analysis such as haemoglobin count, blood type testing, electrolytes, and HIV/hepatitis B-C serology tests) and for “damage control” therapeutic management (surgical packs and massive transfusion packs, including red blood cell packs and lyophilised plasma) [8,9].

The French Role 2 in Gao, Northern Mali, was deployed on February 2013 following the battle of Gao and was based on the operational platform at the Gao civilian airport, near the combat zones. Initially, the French Role 2 was set up under tents and included a health care staff of 14 people: three physicians (one anesthesiologist, one general surgeon, and one orthopedic surgeon), one operating room nurse, two nurse anesthetists, two registered nurses, three auxiliary nurses, one radiology technician, one medical equipment technician, and one administrative officer.

Starting on December 2013, the structure of the French Role 2 in Gao was changed from basic tents to a larger metallic and textile structure with an enhanced health care staff of one internist, one psychiatrist, one emergency physician, one laboratory technician, one dentist, two registered nurses and two auxiliary nurses. This medical and surgical treatment facility (MSTF) or enhanced Role 2 was called Role 2+ “Sahel” (Figs. 1–3). The MSTF supported the French troops of Operation Serval (up to 4000 soldiers), but also soldiers of the MINUSMA and the Malian National Army. Medical



Fig. 1. Metallic and textile structure of the French Role 2+ in Gao, Northern Mali, during Operation Serval.



Fig. 2. Operating room of the French Role 2+ in Gao, Northern Mali, during Operation Serval.

aid to the civilian population (MAP) was added after the High Command of Operation Serval agreed to it, in accordance with the French doctrine of humanitarian care.

Over a period of 18 months (February 2013 to August 2014), the medical data of all patients operated on in the French Role 2 in Gao were prospectively collected in the FileMaker® pro 2008 software (FileMaker Inc., Santa Clara, CA, USA) and analysed retrospectively in a standardised database. Patients were classified according to their military or civilian status: French soldiers, soldiers of the coalition (MINUSMA and Malian National Army), and Malian civilians. Surgical activity was divided into 4 categories: “war-related trauma surgery”, “non-war-related trauma surgery”, “non-trauma emergency surgery”, and “scheduled surgery”. War-related trauma surgeries dealt with civilian or military patients with combat-related injuries (gunshot wounds, fragment shells). Non-war-related trauma surgeries dealt with casualties of domestic or road traffic accidents. Non-trauma emergency surgeries dealt with patients suffering from mainly infectious pathologies, and scheduled surgeries only dealt with the local population within the framework of MAP.

Studied variables were demographic data (age, sex, status), characteristics of injuries (mechanisms and anatomic distribution), and type of surgical procedures performed.

Results

Between February 2013 and August 2014, 268 patients (230 males) were operated on in the French Role 2 in Gao. There



Fig. 3. Intensive care beds of the French Role 2+ in Gao, Northern Mali, during operation Serval.

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