Challenges to surgical care in low middle income countries (lmics)

3 main aspect of surgical care in rural-area/resource-poor environment:

Infrastructures, Infection Control and Staff

Introduction

Health care system in Low Middle Income Countries (LMICs) is something which suffer from resources availability, small percentage of national budget and shortage of staff among a constellation of unstated problems.

Among the entire healthcare system, a considerable amount of resources need to be assigned to surgery, and due to the articulated structure of surgical care it will require a lot. Trelles et al (2015), in fact, say " surgical care is an integral part of any health care system and yet in LMICs access to such care is often limited" (Trelles et al., 2015) . Furthermore Timmers et al (2016) state that " In Africa, surgery may be thought of as the neglected stepchild of global public health" (Timmers et al., 2016) . Even Non-governmental organizations (NGO) and charity company have widely documented the importance of surgery for those countries at war or with lack of resources through reports and experiences.

This essay will review experiences and problems encountered by those NGO in delivering surgical care in those countries classified as LMIC or at War.

Discussion

When a country is in war the surgery needed aimed to stabilise patients and reduce the damage, operating room staff needs to deal with traumatic injuries life-threatening, this is a Damage Control Surgery (DCS) aimed to optimize care of wounded warriors; it must be adaptive to the challenges of

high injury acuity, overwhelming casualty, environmental extremes and logistical austerity (Borden, 2013) . Military the DCS is structured in 4 roles of care: role 1 is the point of injury with the first responder, role 2 is the basic primary care where the initial rudimentary surgery may occur, role 3 is when the patient arrives in a medical treatment facility and where the DCS is achieved, role 4 is based on hospital with a patient transfer outside the war environment to deliver stable, definitive and recovery treatment.

The establishment of a medical centre with an operating department is the problem to resolve in a war tone context or LMIC and looking at the experiences MSF reviewed her provision of surgery in Syria during the civil war from 2012 to 2014 treating nearly 600 patients. MSF set up a field hospital in a rural mountains region in north-west Syria close to the Turkish border. The surgical centre comprised of one Operating Room (OR) in the form of an inflatable tent to ensure a minimum level of cleanliness. They adopted a rudimental way to ensure isolation from environment and protection form contamination formed of plastic sheets for the floor and a wooden frame lined with plastic sheets for roof and they had 3 water points ensuring a minimum requirement of 100 L water anaesthesia and 40-60 L water/person/day furthermore they needed to use a clandestine supply line from Turkey for a regular supply of drugs. MSF used dry-heat sterilization to provide sterility of instrumentation. In a first instance MSF placed the surgical centre in a cave and later they transferred in an abandoned chicken farm; while the tent structure has been kept for the OR they improved the water supply by using the already in place 30, 000 L water tank and the sterilization using now a gas autoclave and a correct circuit of activities from

dirty to clean and sterile with 2 wicket gates for the entry and exit of material.

In this conflict setting with extreme security constraints, where access to surgical care is severely restricted, MSF was able to adopt its modus-operandi and implement a model of emergency surgical care with food outcomes, in fact for the 600 treated patients mainly young male with violent trauma followed by female with obstetric emergencies the intra-operative mortality rate was of 0. 7% (Trelles et al., 2015) . From MSF experience has been highlighted 3 main problem: the need of a healthcare structure to be erected from scratch and that temporary solutions might be the only feasible option, hold the principle of do no harm keeping policies on minimum standard for best practice, standardise protocols for all level of care and maintain an appropriate referral network so that patients who cannot be managed can be referred to appropriate care.

When MSF in Syria found a better solution that the cave they had great benefits, one of the best improvement was the use of a gas autoclave; as Boubour et al (2016) state " deficiencies in the sterile process of medical instruments contribute to poor outcomes for patients such as surgical site infection. In low resources settings deficiencies in sterile process are accentuated due to the lack of access to sterilization equipment or improper use and malfunctioning, lack of power poor protocols and inadequate quality control (Jean et al., 2016) .

Because the high cost of sterilization process hospitals in low resources country use alternative; in the best case scenario manual brushing instead of

electric or ultrasonic, non-electric sterilizers, from this consideration Boubour et al conducted a research where they set “ the sterile box”, a shipping container fitted as central processing unit. In the contained small foyer separates the different stages of process: decontamination, composed of 3 basin sinks; sterilization area with an electric steam sterilizer and drying and storage area with wire racks. The entire container was self-sustaining with water tanks and solar panel to provides power. The efficacy of sterility was showed by the quality tests with a result of 0% probability of a failed decontamination and sterilization. Boubour et al discussing the opportunity of the sterile box state that many hospitals and healthcare facilities desiring sterile instruments but presently unable to have them could benefit of the sterile box reducing instruments-related surgical site infections and improving patient well-being.

Another problem to contain surgical site infection are having well developed infection control policies and how well the operating room staff adhere to them. Cawich et al (2013) set a questionnaire aimed to evaluate staff knowledge of and adherence to existing protocols in a developing country, Jamaica. The study conducted showed that there was no training on the established infection control policies and 19% of staff reported that they had never received instruction about any infection control measures, that they felt their knowledge of infection control practices was inadequate (Cawich et al., 2013) . Surgical Site Infections (SSI) are the most common nosocomial infection with international meta analyses of 5. 6% on surgical procedures; their study showed only 40% of staff adhered to infection control guidelines. A review of literature re-affirms the importance of SSI stating a higher rate of

SSI in developing country than in developed (Cawich et al., 2013) . Basis of policy makers should be the availability of supplies, such as functional hand washing facilities, consistent water supply, disinfecting hand lotion, sterile gowns and gloves, waterproof aprons and safety goggle might be a problem in country like Jamaica where 4% only of the national budget is allocated to the entire Health Service. Alongside the presence of policies, effective strategies for surveillance and reporting health-care associated infections are required to detect policies breaches. Although healthcare workers in LMIC deliver their job at the best of their knowledge and resources that might not be enough to reach a good standard of best practice. Cawich et al (2013) suggest the presence of teams dedicated to monitoring adherence to local guidelines and to prove right this suggestion there is Timmer et al (2016) which described their intensive collaboration between specialized teams from a Dutch hospital and teams of an orthopaedic hospital in Ghana. A NGO " Care-to-Move" gave a huge help to link teams from western countries to the local Africans in order to improve medical treatment, education and training; in fact Timmers et al (2016) state " in Africa, surgery may be thought of as the neglected stepchild of global public health" (Timmers et al., 2016)

The aim of project was to develop a local hospital with the exchange of professional, medical and organisational expertise. In this experience the European team spent much effort on education, operation techniques, regional anaesthesia techniques, scrubbing technique and principles around sterility. The Dutch operating room personnel noticed that the local staff had a lack of interaction between the operating room nurse and the circulating

one. Their educational plan developed though a phase were the specialized team showed the local one the best way to deliver coordination and interaction with all members of the surgical team while the second phase was the local team practising with the improvements and the actuals outcome recorder was an improved timing, planned procedures more efficiently and increase of technical knowledge. Same educational plan was put in place regarding sterility; the major issue noticed was the batch of sterilized instruments used throughout the whole day using sterile clamp to extract instrument needed in that moment. The European team introduced a change, creating specific set of instruments for specific operation implementing the single use batch. Further to sterility the international team improved surgical techniques as well integrating the local knowledge with European updates to deliver a better care with less complications and risks to patients. Timmers et al (2016) affirm that " collaboration between western world medical teams and local Africans teams is considered to be of great importance for both parties" (Timmers et al., 2016) . Even the MSF experience in Syria states the same importance of the local staff and their education, in fact activities were overseen by a team of experienced international staff and supported by several local nurses.

Local staff therefore should not only be educated on techniques and adherence to infection control guidelines but should be as well ensured their adherence and provision to universal precautions of safety. A survey of Kignham et al (2009) demonstrates how healthcare workers in Sub-Saharan Africa are at an increased risk of contracting HIV. Due to the shortage of manpower in surgery in poor countries protecting surgical staff is vital for

personal safety, protection of valuable manpower and for increasing satisfaction and professionalism(Kingham, 2009). The survey demonstrates how only 2 facilities had regular supply of eye protection and sterile gloves, only 3 facilities had a fictional suction pump, 5 facilities had sharp container and sterilizers and 4 facilities had enough aprons. The lack of resources not only is an obstacle to deliver good healthcare but also a risk for the staff undermining an already precarious health system.

Conclusion

In conclusion, this essay wants to focus on the main aspects of surgical care in poor-resources setting.

From the research for this essay 3 main aspects will affect on the service of an operating department: infrastructures, infection control and staff.

Firstly, as dictated from Emergency War Surgery surgical care in war tone should be set on 4 stages where the surgical centre is at the 3 rd place before referral to best environment. This kind of settings have been adopted in the civil world as well; Medécin Sans Frontières, for example, has established an immediate temporary surgical centre in a cave during civil war in Syria and using their strict modus-operandi in such a rural environment they obtain an excellent outcome. MSF needed, as well as military says, to keep a referral network with for the occasion was Turkey through a clandestine route.

Secondly, to reduce mortality and keep low morbidity it has emerged how the Surgical Site Infection should be kept low. This might be reached has

Boubour et al (2016) suggest by the use of " the sterile box": a central sterile processing unit self-sustainable which may relieve the pressure of sterilization from hospitals in developing countries with a narrow budget to healthcare system. In this setting the " sterile box" may serve more than one hospital saving money, electricity and water.

Lastly not less important is the staff, as demonstrated by Timmers et al (2016), a collaboration between specialized western team with local staff improves the techniques and the outcome of surgical care giving new updated information and procedure and educating staff to adherence of infection control guidelines. In addition, Kingham et al (2009) highlight how surgical healthcare providers are unprotected workforce exposed to high risk of developing blood borne infection shaking a healthcare system where the manpower in surgery is in severe shortage.

Several Non-Governmental Organizations like Medécins Sans Frontières, Care-to-Move, Emergency are seriously committed to improve health in those countries classified as Low-Middle Income Country or at war, but a great focus should be put on the education of local staff.

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