

Critical connections

The Complete News Source for Critical Care Professionals

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Society of
Critical Care Medicine

The Intensive Care Professionals

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the Introductory
Program inside!

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TAKE SCCM'S
WEB POLL!

Who or what is usually the primary decision maker when withdrawing life support from a patient in your ICU?

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Critical Care Challenges in AFRICA



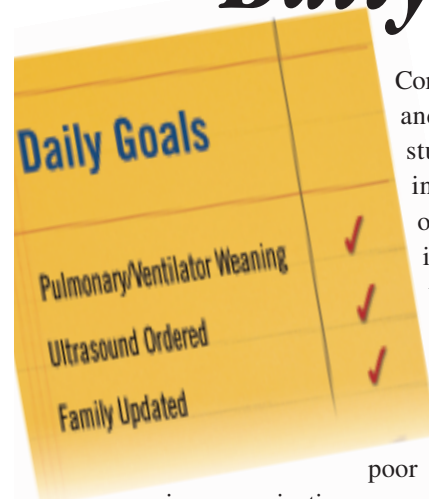
This summer, the Society of Critical Care Medicine (SCCM) took additional steps in its growth as a worldwide organization by collaborating with Doctors for United Medical Missions (DrUMM) to hold its first Fundamental Critical Care Support (FCCS) course in East Africa. Through contributions from SCCM members, the Society's Critical Care Education and Research Foundation (CCERF) provided funding for the project, which took place in June.

In Sub-Saharan Africa, the need for improved critical care services is often overshadowed by the need for basic primary and preventive medical care. Western healthcare professionals often maintain the perception that critical care

(see *Critical Care Challenges in Africa*, page 8)

Critical care nurses teach EKG, monitoring and defibrillation skills during an FCCS skill station.

Effective Communication is a Daily Goal



Communication is the oldest and probably the most studied form of human interaction. Anthropologists and others have been intrigued for centuries by the progression and perfection of all kinds of communication from hieroglyphics to the spoken word. Yet, poor communication or miscommunication was reported as a contributing factor in 31% of incidents submitted to the ICU Safety Reporting System (ICUSRS) from July 1, 2002 to June 30, 2003. Moreover, upon reading these cases, the ICUSRS Team identified that communication problems contributed to most errors, though this factor was often not considered the primary cause by the person reporting the incident. In addition, communication problems contributed significantly to most of the sentinel events reported to the Joint Commission on Accreditation for Healthcare Organizations (JCAHO).

Today, communicating is quick and easy and can be established by emailing, text paging, beeping, or calling on a cell

(see *Effective Communication is a Daily Goal*, page 15)

Journeys with Children and Families



Palliative care in the pediatric intensive care unit (PICU) is a fundamental part of practice and affords the opportunity to journey with families as their children approach the end of life. In taking the time-honored pediatric focus on the family to its ultimate position, the pediatric palliative care team is family-centered, embracing the child and family as a unit, with all the resources and potential impediments that accompany it. Pediatric palliative care is collaborative, combining the expertise of multiple disciplines and providers with the thoughts and goals of the child and family.

Most importantly, pediatric palliative care is flexible, offering care to children at any stage of illness, coordinating therapies to manage any discomfort, assessing goals and translating them into cohesive treatment plans, and competently addressing new symptoms or new issues as they arise.

(see *Journeys with Children and Families*, page 9)

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Relying on Providers as Heroes



Peter J. Pronovost, MD, PhD
The Johns Hopkins University
School of Medicine
Baltimore, Maryland, USA



Christine G. Holzmueller, BLA
The Johns Hopkins University
School of Medicine
Baltimore, Maryland, USA



Sandra P. Bagwell, MD, FCCM
Maine Medical Center
Portland, Maine, USA

The duty of reporting incidents has been an integral part of healthcare administration for decades.

Traditionally, reports are gathered by nurse managers or other unit leaders and shipped to risk management or quality assurance for investigation and appropriate action. Typically, the action targets an individual who is judged and disciplined.

"To Err is Human,"¹ helped healthcare turn the corner and move away from blaming a person. This Institute of Medicine (IOM) report and other researchers²⁻⁴ led the Intensive Care Unit Safety Reporting System (ICUSRS) to look at how care is organized (system factors) and how it may contribute to harm. It showed that healthcare providers are heroes, not enemies. In fact, nurses, doctors, pharmacists, and others work hard every day to limit and prevent broken systems from harming patients. In the first year of reporting to the Web-based error reporting system, the ICUSRS staff found that providers limited harm in 57% of incidents (488 of 854)

and perceived that providers could have prevented 49% of incidents (414 of 854).

To improve safety and reduce errors, we must standardize processes of care. Healthcare providers reduce defects through their use of double-checking and independent redundancy. Double-checking can be done by two people at the same time or by one person who returns to recheck his or her work. One example of the success of double-checking involved two nurses who noticed before administering a unit of fresh frozen plasma to a male patient that the number on the bag was different than the number on the paper attached to the plasma bag. They returned the unit of blood to the blood bank. Another institution participating in the ICUSRS implemented a double-check program in an adult and pediatric ICU and improved medication safety in both units.

Independent redundancy, while similar in nature to double-checking, is a different process. An independent redundancy involves two separate people checking independently of each other and then comparing their findings to see if they match. While double-checking is efficient, independent redundancy is more effective in eliminating errors because it removes the bias engendered when two people simultaneously share the same conclusion. Indeed, the value of independent redundancy is that checks are truly independent. In the real world, however, double-checking may be more feasible in many institutions since coordinating two individuals to separately perform checks could pose staffing challenges.

Another way to standardize processes of care is by bar coding. The Food and Drug Administration recently passed a requirement for bar code labeling of human drug and biologic products.^{5,6} This rule has the potential to reduce medication errors in that scanning adds a method of verifying right drug, dose, administration route, patient, and/or blood product.

While technology, such as bar coding, as a standardized process of care can help improve patient safety, it may also pose a new set of safety hazards. As such, healthcare must always rely on dedicated and qualified providers who work in complex medical systems to mitigate and prevent patient harm. ▲

References are available at SCCM's Web site, www.sccm.org/publications.

Critical Care Challenges in AFRICA



John B. Sampson, MD
Johns Hopkins Hospital
Baltimore, Maryland, USA



Haile Mezghebe, MD
Howard University Hospital
Washington, D.C., USA



Mark Walker, MD
Surgical Health Collective
Atlanta, Georgia, USA

(continued from page 1)

does not exist and is not needed in African countries. However, most healthcare providers would agree that basic fundamental concepts in fluid resuscitation, shock management, and the treatment of life-threatening infections are paramount to any primary care or emergency care practitioner.

In Eritrea, East Africa, the continent's newest country, there is a progressive Ministry of Health who is addressing the healthcare challenges faced by his country. Saleh Meky was trained as a nurse anesthetist in the United States and has efficiently worked

toward equitably distributing Eritrea's limited healthcare resources to both the rural and urban areas of this emerging democracy. He has received assistance from benevolent countries, such as the People's Republic of China, which constructed Orotta Hospital, a new state-of-the-art facility in Eritrea's capital of Asmara. The beautiful and utilitarian facility includes medical/surgical wards, an intensive care unit (ICU), an emergency department, four operating rooms, recovery room, and conference center. China's generous gift to Eritrea is inclusive of such equipment as three new mechanical ventilators, monitors, infusion pumps, and defibrillators.

This modern equipment is of little use without accurate operating knowledge, however. The lack of previous knowledge of such equipment, as well as untranslated Chinese instructions has inhibited Eritrean healthcare professionals from effectively utilizing this equipment for the improvement of quality healthcare.

The Ministry of Health sought the help of DrUMM, a nonprofit, humanitarian organization, to address this challenge. The organization identified SCCM's FCCS course as the best-suited tool for improving critical care knowledge in Eritrea. Many of DrUMM's members, including the president, are active critical care practitioners and SCCM members.

The original plan was to host a class of 26 FCCS participants. After reviewing the curriculum, the Ministry of Health strongly felt that physicians and nurses working in rural hospitals needed a critical care knowledge base almost as much as those who actually worked in Eritrea's only tertiary intensive care unit. The Ministry of Health disseminated information about the FCCS course to hospital directors throughout the country and allowed 13 hospitals to choose two individuals to attend the course.

Even with such national representation, DrUMM volunteers were inundated with requests asking to expand the number of people permitted to attend the course. The desire for knowledge was strong and after discussing the matter with the Ministry of Health, the duration of the course was increased from two days to three days to allow for greater hands-on experience,



Dr. John Sampson (Left) engages participants in an intense ventilator management case discussion during the mechanical ventilation skill station.

question/answer periods and in-depth explanation. The total number of attendees increased to 45. Others were also allowed to audit the lectures, but not participate in the skill stations.

The first day's response was overwhelming. The American Ambassador, the director of the U.S. Agency for International Development (USAID), and the Eritrean news media officially recognized the course. Participants took the pre-test with such intensity that it set a very serious tone for the course to follow.

(see *Critical Care Challenges in Africa*, page 16)

(continued from page 15)

specific therapies. Not surprisingly, the Daily Goals Sheet is now being used in hundreds of ICUs around the world.

The Daily Goals Sheet was first implemented in the intensive care units at The Johns Hopkins Hospital in July 2001. By week seven, more than 95% of residents and nurses reported they understood the daily goals for their patients. In addition, the ICU length of stay (LOS) dropped by one day in the two ICUs that implemented it. While imple-

mentation of the goals sheet correlates with a reduction in LOS, other studies focusing on quality improvements in the ICUs were occurring at the same time and may have contributed to this reduction.

The essence of the Daily Goals Sheet is its ability to structure patient care rounds and facilitate communication between care team members about the desired outcomes for a patient. All members of the multidisciplinary, multiprofessional critical care team—physicians, nurses, respiratory therapists, pharmacists, and others—review the goals for each patient multiple

times during the course of the day and leave the form by the patient's bedside to ensure the plan is explicitly followed. As goals of care change, so does the form. The goals sheet facilitates collaboration and helps practitioners focus on the patient's needs. Furthermore, the establishment of clear goals improves a provider's personal effectiveness and efficiency, thereby leading to more effective and efficient patient care. ▲

References are available at SCCM's Web site, www.sccm.org/publications.

Critical Care Challenges in AFRICA

(continued from page 8)

At the conclusion of the three days, everyone relaxed and expressed deep appreciation for the FCCS course. One of the participants felt that this was the most organized course ever held in Eritrea. Many participants excitedly explained that they could not wait to return to their institutions to pass on the information they had received. And others stressed the need for another FCCS course in Eritrea for those who were not chosen to attend or who needed reinforcement.

Course participant Dr. Goitom Berhane wrote, "I am one of the participants of the seminar that you gave on critical care medicine at Orotta Hospital in Eritrea and one of the surgeons assisting you at the Halibet Hospital. This is to give my words of appreciation and to thank all of the members who have participated in teaching the Eritrean medical community such important concepts regarding the care of critically sick patients. The knowledge and skills that your group provided us will help to improve the quality of care that we provide to our patients." The FCCS course offered the tools for improving the quality of care provided to the sickest patients in Eritrea. Both DrUMM and SCCM plan to continue their collaboration and are planning additional FCCS courses in Ghana and Nigeria.

We extend our gratitude to the SCCM members who made donations to the CCERF to help fund this FCCS course. This course would also not have been possible without the individual sacrifice of the physicians and nurses who dedicated their time to travel to East Africa at their own expense. We would like to send a special thanks to all members of the DrUMM team, including Ingrid White, BS; Tsion Sergot-Michaels, RN; Celia Hightower, RN; Pam Copeland, RN, Esq; and Femi Akinagbe. ▲

Society Members John B. Sampson, MD, was the course director for the FCCS course held in Eritrea, and president of DrUMM; Mark Walker, MD, was the FCCS Course Consultant; and Haile Mezgebe, MD, served as the liaison to the Eritrea Ministry of Health.

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Iso-Osmotic Solution of Esmolol Hydrochloride in Sodium Chloride
FOR INTRAVENOUS USE. CAN BE USED FOR DIRECT INTRAVENOUS USE.
 Esmolol Hydrochloride concentration = 10 milligrams/mL (10,000 micrograms/mL)
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AMPULS MUST BE DILUTED PRIOR TO ITS INFUSION - SEE DOSAGE AND ADMINISTRATION, Directions for Use of the Brevibloc Concentrate 10 mL Ampul (250 milligrams/mL) in full prescribing information.

BRIEF SUMMARY. FOR FULL PRESCRIBING INFORMATION SEE PRODUCT INSERT.

INDICATIONS AND USAGE

Supraventricular Tachycardia

BREVIBLOC (Esmolol Hydrochloride) is indicated for the rapid control of ventricular rate in patients with atrial fibrillation or atrial flutter in perioperative, postoperative, or other emergent circumstances where short term control of ventricular rate with a short-acting agent is desirable. BREVIBLOC is also indicated in noncompensatory sinus tachycardia where, in the physician's judgment, the rapid heart rate requires specific intervention. BREVIBLOC is not intended for use in chronic settings where transfer to another agent is anticipated.

Intraoperative and Postoperative Tachycardia and/or Hypertension

BREVIBLOC (Esmolol Hydrochloride) is indicated for the treatment of tachycardia and hypertension that occur during induction and tracheal intubation, during surgery, on emergence from anesthesia, and in the postoperative period, when in the physician's judgment such specific intervention is considered indicated. Use of BREVIBLOC to prevent such events is not recommended.

CONTRAINDICATIONS

BREVIBLOC (Esmolol Hydrochloride) is contraindicated in patients with sinus bradycardia, heart block greater than first degree, cardiogenic shock or overt heart failure (see **WARNINGS**).

WARNINGS

Hypotension: In clinical trials 20-50% of patients treated with BREVIBLOC (Esmolol Hydrochloride) have experienced hypotension, generally defined as systolic pressure less than 90 mmHg and/or diastolic pressure less than 50 mmHg. About 12% of the patients have been symptomatic (mainly diaphoresis or dizziness). Hypotension can occur at any dose but is dose-related so that doses beyond 200 mcg/kg/min (0.2 mg/kg/min) are not recommended. Patients should be closely monitored, especially if pretreatment blood pressure is low. Decrease of dose or termination of infusion reverses hypotension, usually within 30 minutes.

Cardiac Failure: Sympathetic stimulation is necessary in supporting circulatory function in congestive heart failure, and beta blockade carries the potential hazard of further depressing myocardial contractility and precipitating more severe failure. Continued depression of the myocardium with beta blocking agents over a period of time can, in some cases, lead to cardiac failure. At the first sign or symptom of impending cardiac failure, BREVIBLOC (Esmolol Hydrochloride) should be withdrawn. Although withdrawal may be sufficient because of the short elimination half-life of BREVIBLOC, specific treatment may also be considered (see **OVERDOSAGE** in full prescribing information). The use of BREVIBLOC for control of ventricular response in patients with supraventricular arrhythmias should be undertaken with caution when the patient is compromised hemodynamically or is taking other drugs that decrease any or all of the following: peripheral resistance, myocardial filling, myocardial contractility, or electrical impulse propagation in the myocardium. Despite the rapid onset and offset of the effects of BREVIBLOC, several cases of death have been reported in complex clinical states where BREVIBLOC was presumably being used to control ventricular rate.

Intraoperative and Postoperative Tachycardia and/or Hypertension: BREVIBLOC (Esmolol Hydrochloride) should not be used as the treatment for hypertension in patients in whom the increased blood pressure is primarily due to the vasoconstriction associated with hypothermia.

Bronchospastic Diseases: PATIENTS WITH BRONCHOSPASTIC DISEASES SHOULD, IN GENERAL, NOT RECEIVE BETA BLOCKERS. Because of its relative beta₁ selectivity and titratability, BREVIBLOC (Esmolol Hydrochloride) may be used with caution in patients with bronchospastic diseases. However, since beta₂ selectivity is not absolute, BREVIBLOC should be carefully titrated to obtain the lowest possible effective dose. In the event of bronchospasm, the infusion should be terminated immediately; a beta₂ stimulating agent may be administered if conditions warrant but should be used with particular caution as patients already have rapid ventricular rates.

Diabetes Mellitus and Hypoglycemia: BREVIBLOC (Esmolol Hydrochloride) should be used with caution in diabetic patients requiring a beta blocking agent. Beta blockers may mask tachycardia occurring with hypoglycemia, but other manifestations such as dizziness and sweating may not be significantly affected.

PRECAUTIONS

General

Infusion concentrations of 20 mg/mL were associated with more serious venous irritation, including thrombophlebitis, than concentrations of 10 mg/mL. Extravasation of 20 mg/mL may lead to a serious local reaction and possible skin necrosis. Concentrations greater than 10 mg/mL or infusion into small veins or through a butterfly catheter should be avoided.

Because the acid metabolite of BREVIBLOC is primarily excreted unchanged by the kidney, BREVIBLOC (Esmolol Hydrochloride) should be administered with caution to patients with impaired renal function. The elimination half-life of the acid metabolite was prolonged ten-fold and the plasma level was considerably elevated in patients with end-stage renal disease.

Care should be taken in the intravenous administration of BREVIBLOC as sloughing of the skin and necrosis have been reported in association with infiltration and extravasation of intravenous infusions.

Drug Interactions

Catecholamine-depleting drugs, e.g., reserpine, may have an additive effect when given with beta blocking agents. Patients treated concurrently with BREVIBLOC (Esmolol Hydrochloride) and a catecholamine depletor should therefore be closely observed for evidence of hypotension or marked bradycardia, which may result in vertigo, syncope, or postural hypotension.

A study of interaction between BREVIBLOC and warfarin showed that concomitant administration of

BREVIBLOC and warfarin does not alter warfarin plasma levels. BREVIBLOC concentrations were equivocally higher when given with warfarin, but this is not likely to be clinically important.

When digoxin and BREVIBLOC were concomitantly administered intravenously to normal volunteers, there was a 10-20% increase in digoxin blood levels at some time points. Digoxin did not affect BREVIBLOC pharmacokinetics. When intravenous morphine and BREVIBLOC were concomitantly administered in normal subjects, no effect on morphine blood levels was seen, but BREVIBLOC steady-state blood levels were increased by 46% in the presence of morphine. No other pharmacokinetic parameters were changed.

The effect of BREVIBLOC on the duration of succinylcholine-induced neuromuscular blockade was studied in patients undergoing surgery. The onset of neuromuscular blockade by succinylcholine was unaffected by BREVIBLOC, but the duration of neuromuscular blockade was prolonged from 5 minutes to 8 minutes.

Although the interactions observed in these studies do not appear to be of major clinical importance, BREVIBLOC should be titrated with caution in patients being treated concurrently with digoxin, morphine, succinylcholine or warfarin.

While taking beta blockers, patients with a history of severe anaphylactic reaction to a variety of allergens may be more reactive to repeated challenge, either accidental, diagnostic, or therapeutic. Such patients may be unresponsive to the usual doses of epinephrine used to treat allergic reaction.

Caution should be exercised when considering the use of BREVIBLOC and verapamil in patients with depressed myocardial function. Fatal cardiac arrests have occurred in patients receiving both drugs. Additionally, BREVIBLOC should not be used to control supraventricular tachycardia in the presence of agents which are vasoconstrictive and inotropic such as dopamine, epinephrine, and norepinephrine because of the danger of blocking cardiac contractility when systemic vascular resistance is high.

Carcinogenesis, Mutagenesis, Impairment of Fertility

Because of its short term usage no carcinogenicity, mutagenicity or reproductive performance studies have been conducted with BREVIBLOC (Esmolol Hydrochloride).

Pregnancy Category C

Teratogenicity studies in rats at intravenous dosages of BREVIBLOC (Esmolol Hydrochloride) up to 3000 mcg/kg/min (3 mg/kg/min) (ten times the maximum human maintenance dosage) for 30 minutes daily produced no evidence of maternal toxicity, embryotoxicity or teratogenicity, while a dosage of 10,000 mcg/kg/min (10 mg/kg/min) produced maternal toxicity and lethality. In rabbits, intravenous dosages up to 1000 mcg/kg/min (1 mg/kg/min) for 30 minutes daily produced no evidence of maternal toxicity, embryotoxicity or teratogenicity, while 2500 mcg/kg/min (2.5 mg/kg/min) produced minimal maternal toxicity and increased fetal resorptions.

Although there are no adequate and well-controlled studies in pregnant women, use of esmolol in the last trimester of pregnancy or during labor or delivery has been reported to cause fetal bradycardia, which continued after termination of drug infusion. BREVIBLOC should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nursing Mothers

It is not known whether BREVIBLOC (Esmolol Hydrochloride) is excreted in human milk; however, caution should be exercised when BREVIBLOC is administered to a nursing woman.

Pediatric Use

The safety and effectiveness of BREVIBLOC (Esmolol Hydrochloride) in pediatric patients have not been established.

ADVERSE REACTIONS

The following adverse reaction rates are based on use of BREVIBLOC (Esmolol Hydrochloride) in clinical trials involving 369 patients with supraventricular tachycardia and over 600 intraoperative and postoperative patients enrolled in clinical trials. Most adverse effects observed in controlled clinical trial settings have been mild and transient. The most important adverse effect has been hypotension (see **WARNINGS**). Deaths have been reported in post-marketing experience occurring during complex clinical states where BREVIBLOC was presumably being used simply to control ventricular rate (see **WARNINGS, Cardiac Failure**).

Cardiovascular—Symptomatic hypotension (diaphoresis, dizziness) occurred in 12% of patients, and therapy was discontinued in about 11%, about half of whom were symptomatic. Asymptomatic hypotension occurred in about 25% of patients. Hypotension resolved during BREVIBLOC (Esmolol Hydrochloride) infusion in 63% of these patients and within 30 minutes after discontinuation of infusion in 80% of the remaining patients. Diaphoresis accompanied hypotension in 10% of patients. Peripheral ischemia occurred in approximately 1% of patients. Pallor, flushing, bradycardia (heart rate less than 50 beats per minute), chest pain, syncope, pulmonary edema and heart block have each been reported in less than 1% of patients. In two patients without supraventricular tachycardia but with serious coronary artery disease (post inferior myocardial infarction or unstable anginal), severe bradycardia/sinus pause/asystole has developed, reversible in both cases with discontinuation of treatment.

Central Nervous System—Dizziness has occurred in 3% of patients; somnolence in 3%; confusion, headache, and agitation in about 2%; and fatigue in about 1% of patients. Paresthesia, asthenia, depression, abnormal thinking, anxiety, anorexia, and lightheadedness were reported in less than 1% of patients. Seizures were also reported in less than 1% of patients, with one death.

Respiratory—Bronchospasm, wheezing, dyspnea, nasal congestion, rhonchi, and rales have each been reported in less than 1% of patients.

Gastrointestinal—Nausea was reported in 7% of patients. Vomiting has occurred in about 1% of patients. Dyspepsia, constipation, dry mouth, and abdominal discomfort have each occurred in less than 1% of patients. Taste perversion has also been reported.

Skin (Infusion Site)—Infusion site reactions including inflammation and induration were reported in about 8% of patients. Edema, erythema, skin discoloration, burning at the infusion site, thrombophlebitis, and local skin necrosis from extravasation have each occurred in less than 1% of patients.

Miscellaneous—Each of the following has been reported in less than 1% of patients: Urinary retention, speech disorder, abnormal vision, midscapular pain, rigors, and fever.

HOW SUPPLIED

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 BREVIBLOC PREMIXED INJECTION - DOUBLE STRENGTH
 NDC 10019-075-87, 2000 mg - 100 mL in Ready-to-use 100 mL IntraVia Bags
 BREVIBLOC INJECTION
 NDC 10019-015-01, 100 mg - 10 mL Ready-to-use Vials, Package of 25
 BREVIBLOC CONCENTRATE
 NDC 10019-025-18, 2500 mg - 10 mL Ampuls for Dilution, Package of 10

Store at 25°C (77°F). Excursions permitted to 15°-30°C (59°-86°F). [See USP Controlled Room Temperature.] PROTECT FROM FREEZING. Avoid excessive heat.

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