Israel Defense Forces Clinical Practice Guidelines for Helicopter Medical Evacuation of Combat Casualties

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INTRODUCTION

Reducing the time from injury to definitive medical care is a cornerstone of trauma systems, particularly in wartime. The initial phase of medical evacuation (medevac) is occasionally carried out on foot but usually employs ground or helicopter (heliborne) transport.

During the Second World War, the mean time from injury to definitive medical care exceeded 10 hours. In the Korean War, the first conflict in which rescue helicopters were regularly employed, evacuation times dropped to under 5 hours. In the Vietnam War, advanced triage and rapid heliborne evacuation reduced this time to under 2 hours, accompanied by a marked reduction in mortality. Physicians returning from Vietnam subsequently introduced heliborne evacuation into civilian trauma systems [1,2].

In 2009, U.S. Secretary of Defense Robert M. Gates ordered that all severely injured casualties in Afghanistan be evacuated within 60 minutes, in accordance with the "golden hour" concept. A study of approximately 21,000 casualties comparing the periods before and after this directive reported a decrease in median evacuation time from 90 to 43 minutes and a substantial reduction in mortality and case fatality rate [1]. Another study of approximately 5,000 casualties showed that delivering a casualty alive to a surgical team within one hour of injury was associated with a 66% reduction in 24-hour mortality [3]. Among casualties requiring emergency surgery, immediate initiation of surgery was associated with a 60% reduction in mortality [3].

In Israel, helicopter medevac of combat casualties was first used systematically during the Six-Day War (1967). In the Yom Kippur War (1973), approximately 5,000 casualties were evacuated from the various fronts by air, nearly 30% of them by CH-53 helicopters ("Yas'ur"). Shortly thereafter, the Israeli Air Force (IAF) elite rescue Unit 669 (similar in role to U.S. pararescuemen, or PJs)

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was established. Since the First Lebanon War (1982), evacuation helicopters have been an integral part of the medical evacuation chain [4,5].

An analysis of helicopter evacuations of urgent casualties admitted from the northern and southern fronts during the ground maneuvers of the Swords of Iron War (27 October 2023 to 31 July 2025) found a median helicopter evacuation time of 69 minutes (IQR 55–93 min), 31 minutes shorter than the median ground evacuation time (100 min, IQR 69–157 min). About 35% (614) of casualties evacuated by helicopter reached a hospital within one hour, compared with about 18% (793) of those evacuated by ground. However, in some locations and combat scenarios, ground evacuation was faster than heliborne evacuation [6].

Most potentially preventable combat deaths occur early after injury, usually before arrival at a medical facility, primarily due to non-compressible hemorrhage [7]. The survival benefit of heliborne evacuation therefore derives not only from the shorter evacuation time but also from the medical capabilities brought to the casualty.

A U.S. study from Afghanistan found that dedicated medical evacuation helicopters, staffed with medical teams and equipment, were associated with better survival than nearby non-medical aircraft used opportunistically, some of which carried no medical personnel, even though the non-medical aircraft had shorter evacuation times [8].

Several observational studies of civilian trauma systems have reported a survival advantage for helicopter over ground ambulance transport. A large retrospective cohort study from the U.S. National Trauma Data Bank reported that patients transported by helicopter to level I or II trauma centers had 16% higher odds of survival than those transported by ground ambulance [9].

Studies that attempted to separate the effect of speed from that of in-flight care examined casualties whose helicopter evacuation time was not shorter (and sometimes longer) than the potential ground evacuation time. Heliborne evacuation remained associated with a survival advantage in these patients, particularly for evacuation times between 6 and 30 minutes. Studies from France reported similar findings: despite longer on-scene and total transport times, helicopter evacuation was associated with approximately one-third lower odds of death than ground transport. This advantage has been attributed to the expertise of the medical crews and their ability to perform advanced interventions in flight, such as blood product administration, advanced airway management, and treatment of thoracic injuries [10–13].

In many scenarios, helicopter evacuation enables a skilled airborne medical team to reach the casualty and transport them faster to a medical facility. Nevertheless, the decision to employ helicopter evacuation requires clinical judgment tailored to the operational situation and the casualties' medical condition, and it should be requested only when it offers a clear advantage over the alternatives.

Helicopter evacuation depends on continuous communication among medical personnel, commanders, and the IAF, and particularly on close coordination between two distinct echelons: ground and airborne medical teams.

Ground medical teams are forward-deployed and consist of a military physician or paramedic who has completed Military Trauma Life Support (MTLS) training, together with two or three combat medics; they provide immediate point-of-injury care and triage.

Airborne medical teams are specialized evacuation crews from IAF Unit 669, composed of senior physicians (specializing in Emergency Medicine, Anesthesiology, or Surgery), paramedics, and combat medics who specialize in en-route damage control resuscitation. Their composition depends on the helicopter type (Table 1).

This clinical practice guideline (CPG), intended for advanced life support (ALS) providers in the field (military physicians or paramedics who have completed specialized MTLS training), describes the full course of an operational helicopter medevac, defines key terms, details the relevant considerations and techniques, and discusses interactions between the ground forces and the IAF. The protocol is summarized in Figure 1.

Unlike civilian clinical guidelines, which are non-binding, evidence-based recommendations, this CPG is an operational directive of Israel Defense Forces (IDF)

Helicopter	Medical team	Capacity (optimal treatment)	Maximum capacity (extreme cases)
UH-60 Yanshuf	Senior physician, paramedic, and 3 combat medics	2 litter casualties	3 litter casualties, at the expense of treatment efficacy
CH-53 Yas'ur	Senior physician, 2 paramedics, and 5 combat medics	3 litter casualties	6 litter casualties, at the expense of treatment efficacy

Table 1. Medical evacuation helicopters of the Israeli Air Force and their capabilities. Optimal capacity is the ideal number of casualties that gives the medical crew enough space to provide proper, effective care during the flight. Maximum capacity is the maximum number of casualties that can physically fit inside the helicopter, although crowding may prevent proper in-flight medical treatment.

Medical Corps policy: its procedures are mandatory and standardized to maintain high-quality care and adherence under operational conditions.

Helicopter Medical Evacuation Protocol

Explanation of the Protocol

1. Pre-mission planning

The evacuation plan in the operational procedure must include landing zones (LZs) both in the rear and in enemy territory. LZ planning derives from the unit's operational plan and takes into account friendly-force deployment and enemy threats. Operational commanders (the commanding officer or other operations elements) must plan the LZs together with medical personnel, air liaison officers (ALOs), intelligence, and combat engineering personnel. The IAF approves the LZs through the ALO. During ongoing combat operations in an established sector, IAF-preapproved LZs are usually available.

The operational procedure must specify the evacuation modality for various points in the sector, based on a comparison of the expected ground evacuation time with the IAF's estimated flight time.

During operational planning, commanding officers must pre-designate the forces responsible for securing and managing the LZ. These forces must be well trained to operate the LZ in various combat scenarios, including providing close and distant cover and guiding the helicopter to landing.

During combat operations, commanders must verify the relevance and readiness of the LZs daily, for example through an LZ familiarization tour, a daily evacuation coordination meeting, and re-confirmation with IAF personnel that all LZs in the sector are approved for landing.

2. Initial incident report and request for helicopter medevac

Request helicopter evacuation as soon as possible after the incident begins: the time required to scramble the crew and power up the helicopter's systems adds to the flight time. Send the initial request to the superior echelon for relay to the IAF command center, which allocates helicopters to the incident and coordinates the operational envelope for helicopter entry.

Resource allocation depends on the situation report received from ground medical forces; therefore, send as detailed a report as possible, as early as possible.

Keep the initial report concise, containing only the information needed to alert the system:

- Nature of the incident.
- The force that was hit.
- Number of casualties and, if needed, declaration of a mass-casualty incident (MCI), defined as a combat event in which the number of casualties exceeds the treatment or evacuation capacity of the on-scene ground medical force.
- Incident location and planned LZ.
- Whether special breaching or rescue equipment is required (not all helicopters carry this equipment by default).

The report is usually sent by an operations element but may also be sent by a medical force.

3. Arrival of the medical force at the scene and situation report

On arrival at the incident site, the ground medical team must compile a detailed situation report that includes:

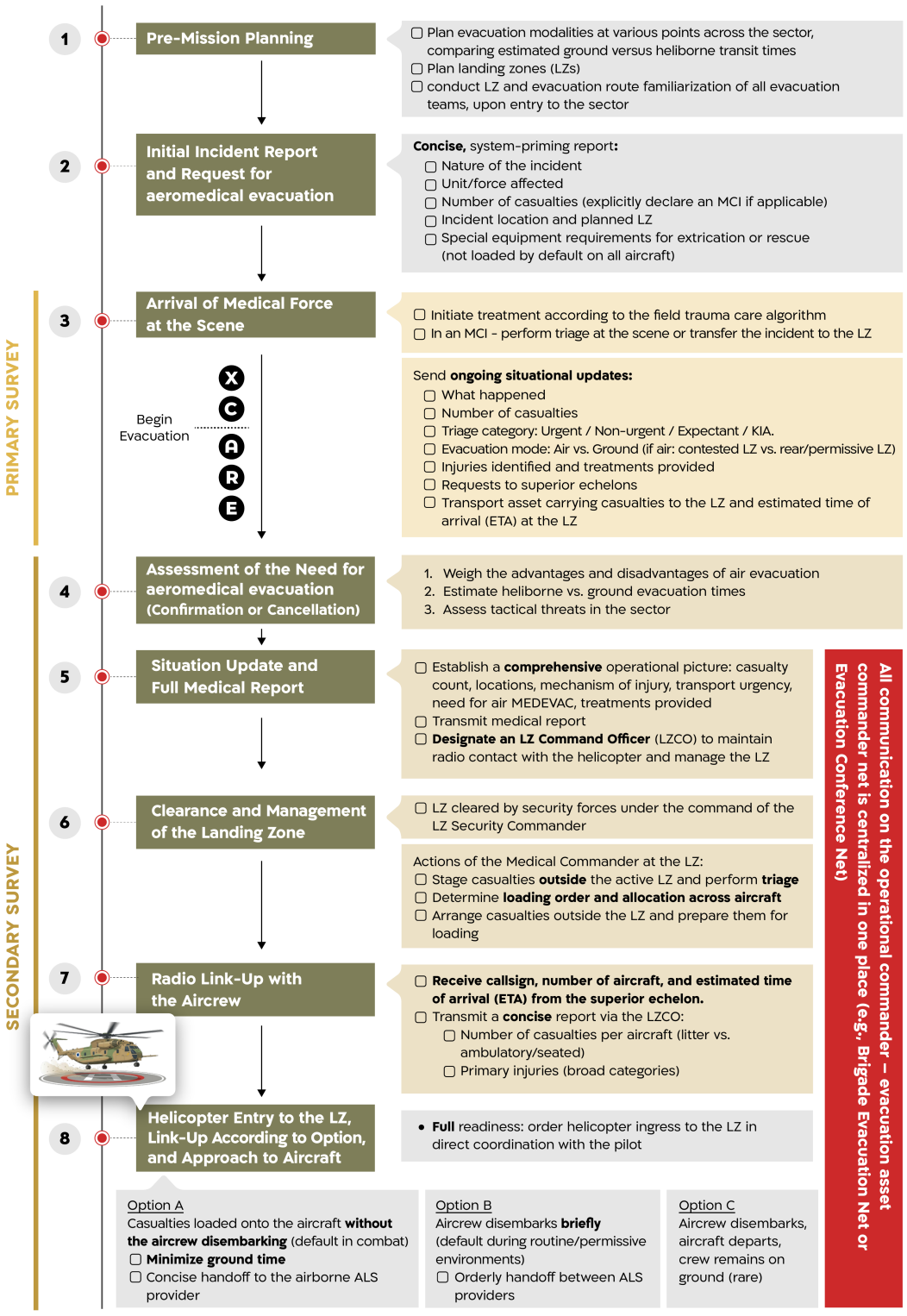


Figure 1. Israel Defense Forces helicopter medical evacuation protocol. ETA, estimated time of arrival; KIA, killed in action; LZ, landing zone; LZCO, LZ commanding officer; MCI, mass-casualty incident; RDCR, remote damage control resuscitation.

- What happened.
- Number of casualties.

• Classification of casualties by urgency – urgent, non-urgent, expectant, or killed in action (KIA) – and the intended evacuation mode (heliborne or ground); for heliborne evacuation, whether to a hostile/contested or a rear/permissive LZ.
• Injuries and treatments given (to be expanded later during ground evacuation and in the situation update).
• Requests to superior echelons, as needed: medical reinforcements, evacuation assets, additional medical equipment, and helicopter medevac.
• The vehicle on which casualties will be evacuated to the LZ, and their estimated time of arrival (ETA) at the LZ.

4. Assessment of the need for air evacuation

For an urgent casualty, the main consideration in choosing helicopter evacuation is usually time. When heliborne evacuation offers no substantial time advantage, prefer ground evacuation. In addition to flight time to the incident and to the nearest hospital, consider helicopter scramble time (approximately 15 minutes), link-up and landing time, and drive time from the hospital helipad to the trauma bay.

For evacuations from a combat zone, weigh the casualty's condition and the urgency of evacuation against the threats in the sector. As a guiding principle, for casualties whose lives are at risk in the short term, evacuate by the fastest possible means, even at the cost of increased risk to the force. In such cases, report to superior echelons across the chain of command, including the superior medical echelon.

Identifying a casualty with an immediate life-threatening condition requires clinical assessment and depends on the provider's judgment in the field, in consultation with the superior medical echelon when needed. Examples include casualties with uncontrolled hemorrhage, a gunshot wound to the torso, a need for blood products, loss of consciousness, or a need for positive-pressure ventilation.

In contrast, for urgent casualties without an immediate life-threatening condition, consider ground evacuation to a hospital or a rear LZ at a lower threat level.

Advantages of heliborne evacuation:

• Shorter evacuation time – depending on distance and operational circumstances, ground evacuation is often expected to take substantially longer than helicopter evacuation.
• Mobility – the helicopter enables evacuation when terrain, evacuation routes, or operational conditions do not allow efficient or safe ground evacuation of the casualty.
• Evacuation to distant tertiary medical centers – when injury occurs in a peripheral area without nearby trauma centers, a helicopter can reach a level I trauma center quickly. For instance, ground evacuation from the northern border can reach secondary medical facilities quickly, whereas transport to the nearest tertiary center (Rambam Medical Center) can take an hour or more. Similarly, ground evacuation from the Gaza Strip to the nearest tertiary center (Soroka Medical Center) can take an hour or more. There is no blanket directive to evacuate all casualties with head injuries by helicopter to a neurosurgical center.
• Evacuation of multiple casualties by an experienced, skilled airborne medical team – the helicopter is staffed by senior providers (specialized physicians and experienced paramedics) and can evacuate several casualties simultaneously while providing optimal care.
• Advanced treatment capability – onboard equipment includes advanced physiological monitoring and robust volume resuscitation capabilities, supporting damage control resuscitation principles in the field (e.g., whole blood is carried on every IAF medevac helicopter).
• Rescue capabilities – the helicopter crew can perform rescue missions in a variety of terrain types and breaching scenarios.

Disadvantages of heliborne evacuation:

• Field landing constraints – a helicopter requires a suitable LZ. A suitable LZ may be available near the point of injury, but in other cases reaching it substantially lengthens the total evacuation time. In complex scenarios, a “hover” (the helicopter hovers with doors open without landing) or hoist evacuation can be performed.
• “High-value target” for the enemy and risk to the force – a helicopter is a preferred target for enemy fire.
• Exposure of the force in the field – helicopter landing exposes the ground force and the LZ and may compromise the LZ for future use.
• Weather limitations – severe weather conditions may limit helicopter landing.

Treatment and evacuation capabilities: helicopter evacuation is carried out by one of two IAF helicopter types crewed by medical personnel from Unit 669 (Table 1).

5. Situation update and transmission of a full medical report

During ground evacuation, as casualties are assessed more thoroughly and treatment is initiated, transmit regular updates over the radio network to maintain an accurate situational picture. When the battalion evacuation elements arrive, or ground evacuation to the LZ begins, transmit reports on a frequency monitored by all forces, to allow direct communication among all evacuation and medical commanders and the treating crew on the helicopter.

For urgent casualties, transmit a complete clinical report covering all body systems and the casualty's overall condition.

At this stage, a single operational commander must be designated to maintain radio contact with the helicopters and manage the LZ.

6. Opening and management of the LZ

Position evacuation vehicles outside the LZ. Casualties, the medical force, and litter-bearers must also wait at the edges of the LZ.

Three commanders are involved in management of the LZ:

• LZ security commander and LZ security force – designated in the operational procedure; they must always be available for the mission and must be separate from the evacuation force. The security force should preferably be a defined combat force whose sector contains the LZ; this force is responsible for setting up the LZ.

• LZ commanding officer (LZCO): an operations commander from the evacuation force who (1) conducts radio link-up with the helicopter to transmit essential information, (2) reports to the helicopter when the ground team is ready for its entry, and (3) marks the LZ for the helicopter according to the pilot's request and timing. The operational procedure must designate the landing team commander and ensure that the landing team has landing-guidance equipment that meets IAF requirements. Every evacuation vehicle must carry the equipment required for landing guidance.

• A single medical commander must be designated. Their role is to link up with the LZCO, organize the LZ, perform triage, prioritize casualties for loading, ensure that casualties are ready for loading, and perform the medical handover to the ALS provider on the helicopter.

The medical commander oversees the following:

a. Concentrating casualties at the LZ and performing triage

In an MCI, the medical commander must also perform full triage upon arrival at the LZ. All casualties must be concentrated at the LZ entrance in an orderly fashion, and the medical commander assumes responsibility for each casualty.

b. Deciding the loading order and allocating casualties to helicopters

The medical commander, together with the LZCO, decides the loading order based on casualty arrival order, urgency, and helicopter availability. In an MCI, load the most urgent casualties first.

c. Arranging casualties outside the LZ and preparing for evacuation

In a contested environment, proper advance preparation of casualties saves ground time and reduces the threat to the helicopter.

• Removal of weapons from the casualty.

• Loading and securing the casualty to the litter – "package" the casualty well, including a helmet, earplugs, and eye protection, and secure the casualty to the litter, taking particular care to tuck in the space blanket so that it is not blown into the rotor.

• Securing vascular access and other interventions – verify that all tubing (vascular access, volume resuscitation, ventilation) is well secured to prevent dislodgement during loading. For casualties receiving a blood product transfusion, securely attach the blood unit to the casualty.

• Ventilated casualties – right before boarding the helicopter, disconnect the bag-valve-mask (BVM) from the endotracheal tube until the casualty is on board, to prevent accidental extubation.

• Removal of all medical devices that will not continue with the casualty onto the helicopter, such as the blood pressure cuff and pulse oximeter.

• Folding radio antennas of the litter-bearers (risk of rotor strike).
• Folding telescopic poles on litters (extended poles prevent the helicopter door from closing and delay takeoff).
• Removal of equipment that might blow into the rotor – trash, clothing remnants, removed dressings, etc.
• Preparation of medical documentation for transfer – prepare a structured handover using the prehospital casualty card (form 101 in the IDF).
• Readiness for helicopter entry – just before the helicopter enters the LZ, lift the litter to waist height, ready to move immediately to the helicopter and load the casualty after landing. Disconnect devices, ventilation, and oxygen, and pause infusion of whole blood or plasma.

While awaiting the helicopter, continue treating casualties, with emphasis on measuring vital signs. Do not delay helicopter entry for ground treatment, except to control life-threatening external bleeding. Perform all additional treatment on the helicopter during evacuation.

7. Radio link-up with the helicopter crew

As early as possible during the evacuation, the superior echelon must pass details of the allocated helicopters to the LZCO and the medical commander, particularly their callsigns and ETA.

As the helicopter approaches, its crew links up by radio with the LZCO on the medical net. At this stage, communication focuses on technical coordination of the landing and LZ setup. The LZCO must transmit a concise report that includes only the following details:

• Number of casualties to be loaded onto the helicopter (litter and seated).
• Main injuries (key diagnoses only).
• Coordination of the zone for link-up with the helicopter.
• Clinical details that may physically affect link-up at the helicopter door, such as an intubated casualty, ongoing junctional or direct pressure, requirement for blood resupply, or shortage of ground personnel to lift litters to the helicopter.

Only after casualties have been concentrated, the evacuation order has been decided, and casualties and team are fully ready will the LZCO give the order for the helicopter to enter the LZ, in direct coordination with the pilot.

Limitations. This guideline has several limitations. First, its recommendations constitute an operational directive of IDF Medical Corps policy rather than the product of a formal systematic review and grading of the evidence. Second, the supporting evidence summarized in the Introduction is largely observational and retrospective; it derives partly from other military and civilian systems and partly from the IDF Medical Corps Trauma and Combat Medicine Branch data summary of the Swords of Iron War, including evacuation data. Therefore, it cannot establish that any individual element of this protocol improves outcomes. Third, the IAF, including its elite Unit 669, represents a uniquely structured system, and Israel's geography, including the short distances from its borders to trauma centers, limits generalizability to other medical systems.

CONCLUSIONS

Heliborne evacuation can contribute to casualty survival through the skill of airborne medical teams and the time saved until hospital arrival. Optimal helicopter evacuation requires close coordination, casualty preparation, discipline, and precise timing. At the same time, there must always be room for judgment, including in the decision whether to use helicopter evacuation, weighing its advantages and disadvantages. Protocol knowledge, rigorous training, and sound operational judgment are essential to successful evacuation and improved survival outcomes.

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References

1. Kotwal RS, Howard JT, Orman JA, et al. The effect of a golden hour policy on the morbidity and mortality of combat casualties. JAMA Surg 2016; 151(1):15-24.
2. Kennedy K, Aghababian RV, Gans L, Lewis CP. Triage: techniques and applications in decision making. Ann Emerg Med 1996; 28(2):136-144.
3. Shackelford SA, Del Junco DJ, Mazuchowski EL, et al. The golden hour of casualty care: rapid handoff to surgical team is associated with improved survival in war-injured US service members. Ann Surg 2024; 279(1):1-10.
4. Schwartz D, Resheff A, Geftler A, et al. Aeromedical evacuation from the second Israel-Lebanon war: a descriptive study. Mil Med 2009; 174(5):551-556.
5. Ran Y, Hadad E, Daher S, et al. Triage and air evacuation strategy for mass casualty events: a model based on combat experience. Mil Med 2011; 176(6):647-651.
6. Israel Defense Forces Medical Corps, Trauma and Combat Medicine Branch. Fighting for life: operational medicine in the war 2023-2025. Ramat Gan: Surgeon General's Headquarters; 2025.
7. Eastridge BJ, Mabry RL, Seguin P, et al. Death on the battlefield (2001-2011): implications for the future of combat casualty care. J Trauma Acute Care Surg 2012; 73(6 Suppl 5):S431-S437.
8. Kotwal RS, Staudt AM, Trevino JD, et al. A review of casualties transported to role 2 medical treatment facilities in Afghanistan. Mil Med 2018; 183(Suppl 1): 134-145.
9. Galvagno SM, Haut ER, Zafar SN, et al. Association between helicopter vs ground emergency medical services and survival for adults with major trauma. JAMA 2012; 307(15):1602-1610.
10. Desmettre T, Yeguiayan JM, Coadou H, et al. Impact of emergency medical helicopter transport directly to a university hospital trauma center on mortality of severe blunt trauma patients until discharge. Crit Care 2012; 16(5):R170.
11. Gauss T, Ageron FX, Devaud ML, et al. Association of prehospital time to in-hospital trauma mortality in a physician-staffed emergency medicine system. JAMA Surg 2019; 154(12):1117-1124.
12. Brown JB, Gestring ML, Guyette FX, et al. Helicopter transport improves survival following injury in the absence of a time-saving advantage. Surgery 2016; 159(3): 947-959.
13. Chen X, Gestring ML, Rosengart MR, et al. Speed is not everything: identifying patients who may benefit from helicopter transport despite faster ground transport. J Trauma Acute Care Surg 2018; 84(4):549-557.