

## Gunshot Wounds in Military Working Dogs

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Ballistic wounds account for approximately half of the life-threatening or fatal wounds incurred by military working dogs in Afghanistan and Iraq. High-energy explosive blast injuries account for approximately the same number of serious and fatal injuries as ballistic injuries. Blunt trauma from falls or high-impact collisions round out most of the other serious cases. MWDs on patrols and "outside the wire" are susceptible to the same injuries as human servicemembers, and the veterinary units down-range are treating these dogs relatively often. In a collaborative effort between SOF and conventional veterinary forces, these cases are being analyzed for medical and operational factors in order to increase survival and increase return to duty of seriously injured MWDs in theater.

Preliminary analysis of data from gunshot wounded dogs in OEF and OIF reveals that about half of the gunshot wounds were fatal. The other half survived, although most were critically wounded. Survival cases include GSW to the head, the thorax, abdomen, and the extremities where significant hemorrhage occurred. Other than gunshot wounds to the extremities, there does not appear to be any difference in survivability based on location of the wound (i.e. head vs. thorax, etc.); however, the number of cases studied is so small (under 15) that this may not be statistically significant and can change as more cases occur.

Wound distribution of fatal wounds in MWDs does not appear to mirror human fatal wound distribution. There may be multiple reasons for this, the most obvious reason being differences in anatomy and locomotion. The four-legged, head-first stance of dogs vs. upright stance of humans may be placing them in a different orientation when facing their attackers. Also, human body armor provides significant protection for the torso. Although commercially available, none of the dogs with ballistic wounds were wearing canine body armor. Unfortunately, the extremely hot environmental temperatures (sometimes over 120 degrees F) and heavy weight of canine body armor increases their chance of heat injury. Due to the operational environment, appropriate work-rest cycles are not always possible, and the heavy weight of most canine body armor relative to their total body weight limits mobility and quickly tires out most dogs. In addition, the effectiveness of human body armor comes largely from the ceramic or other plates, which canine body armor does not contain. While it may be effective in protecting against shrapnel and explosive fragments, the increased chances of heat in-

jury, limited mobility, extra weight, and lack of significant protection due to no ceramic plates makes canine body armor a liability that outweighs its minimal protective effect for dogs in many operational situations.

Return to duty rate in the surviving dogs has been nearly 70%, with the remaining dogs currently undergoing treatment with a good prognosis for return to duty. Some of these dogs were treated entirely in theater, recovered from their critical wounds, and returned to duty to complete their tour without ever leaving theater. This was obviously not consistent with the "doctrine" of RTD within 72 hours or MEDEVAC to higher echelon of care. However, the foresight and hard work of the veterinary teams, handlers, and human medical providers allowed these dogs to return relatively quickly to the fighting force.

Although there were other human servicemember casualties, none of the handlers of these dogs sustained significant injury during the situation in which their dog incurred ballistic injury.

Currently there are not enough cases to analyze to find statistically significant data on survival vs. fatal wounds. However, there are several common factors in the survival cases that are worth noting and offer valuable lessons learned.

First, handlers and Medics who treated seriously injured dogs in the field that survived had undergone a significant amount of canine emergency training prior to deploying. Canine training was based on Tactical Combat Casualty Care (TCCC) standards, and their care in the field reflected this. For example, Medics performed needle decompression of the chest in one case and placed a thoracotomy tube in the other.

Second, use of human medical facilities, equipment, and personnel was essential in all but one case. In most of the cases, the veterinarians felt that they and their 68T\* alone (if they had a 68T) were unable to provide the level of care necessary to manage a critically injured dog, provide critical care anesthesia during surgery, or provide post-operative critical care without outside assistance. Even if they had the knowledge and equipment, they simply did not have enough skilled veterinary unit personnel to assist, and MEDEVAC to another location would have further delayed life-saving care. The veterinarian in all but one of the gunshot wound cases studied actively sought assistance from physicians (surgeons and emergency specialists), Certified Registered Nurse Anesthetists, emergency department staff, and operating room

technicians to help provide critical care and felt this care was essential in the dog's survival. The veterinarian simply cannot do everything at once. Basic tenants of triage and emergency case management state that the highest skilled person is there to THINK, and direct others to ACT.

Most of the dogs were stabilized in the emergency department of a CSH or Air Force Theater Hospital prior to being transferred to the veterinary facility. In some cases it was because the veterinarian had not yet arrived to receive the dog. In others, it was due to the immediate need for lifesaving treatment before moving the dog to the veterinary facility, or lack of certain equipment in the veterinary facility. This also allowed the veterinarian to think the case through, communicate with the theater 64F\*\* or commander, and direct assets as necessary while other skilled medical personnel physically applied the treatments. Only one case was evacuated from a lower level of veterinary care to higher; most were treated at the initial receiving location for several days until stable, and then only evacuated higher if preparing for MEDEVAC to Germany or CONUS. It's worth noting though, that in a few of these cases the initial receiving location was at the Veterinary HQ with the 64F and the dog was already at the highest level of veterinary care available in theater.

Extensive canine CASEVAC planning by the canine units led to appropriate CASEVAC and MEDEVAC of these injured MWDs. Many locations where MWDs are located in theater do not have veterinarians. The Veterinary Corps Officers (VCO) cover wide areas that include many FOBs and may not be at their usual facility when an emergency arises. Many units are including canine CASEVAC planning in their medical planning, and before leaving on any mission, determine the best place to take an injured dog on that particular day, and pre-coordinate a rapid system of notifying the veterinarian of incoming canine casualties.

Revisiting the idea of canine emergency training; some of the aircrews involved with canine CASE-

VAC/MEDEVAC had trained with veterinarians and 68Ts in theater to be better prepared to manage an injured dog in their aircraft. Similarly, the VCOs and 68Ts learned the safe way to approach an aircraft to load or unload a canine patient, and in the case that they had to escort an injured dog on a flight, learned basics of communicating over the radio and using the medical equipment sets on the aircraft, expediting transfer of patients from aircrew to the veterinary team on arrival. Veterinary escort was provided from theater to CONUS in two cases by a senior Animal Care Specialist sent from CONUS for these missions. Veterinary escort was deemed necessary due to the injuries, which, although stable, may have worsened due to the effects of altitude during the MEDEVAC flights (resolved pneumothorax and resolved pneumocranium). Altitude restrictions were placed on one of the flights by the CASF flight surgeon just for the dog!

While these may be anecdotal factors, they all contributed in some way to the survival of these critically wounded MWDs. There will inevitably be more cases of ballistic wounds in MWDs in the future, and we will continue our analysis. VCOs and 68Ts can help increase chances of survival by actively providing canine trauma management training to their handlers, Medics, and other human medical providers of units that use MWDs. VCOs and 68Ts can prepare themselves for managing critically injured dogs by actively seeking training and experience in critical care monitoring and anesthesia, trauma management, blood transfusion, fluid therapy, and working safely around rotary winged aircraft.

We offer special thanks to the current and previously deployed units, handlers, Medics, and aircrews who have provided such great care and information in the project.

\* Army Military Occupational Specialty 68T is an Animal Care Specialist/NCO.

\*\* Army Officer Area of Concentration 64F is a Veterinary Clinical Medicine Officer (residency-trained surgeon, internist, intensivist or radiologist).