ULTRASOUND IN THE ROYAL DANISH AIR FORCE
SEARCH AND RESCUE HELICOPTER

INTRODUCTION

The use of ultrasound (SonoSite® NanoMaxx®) was tested in a 24 hour period in late Fall 2014 on the Royal Danish Air Force (RDAF) Search And Rescue (SAR) helicopter, stationed in Aalborg, North Denmark Region, Denmark. The aim of the test was to identify the possible advantages and disadvantages with the use of ultrasound in the harsh and extreme environment which the equipment is exposed to on SAR missions. The emphasis was made on the climate, vibrations, work ergonomics and impact of early diagnosis and treatment in the prehospital setting on the AgustaWestland EH 101 Merlin Rescue Helicopter in the RDAF. I present two cases from the RDAF SAR helicopter unit, where the use of prehospital ultrasound disclosed significant pathology and changed the priority of treatment.

CASE 1

A 28 year old male motorcyclist involved in a motorcycle crash with possibly three injured persons. It was dark and the temperature was 16 degrees Celsius. At the time the SAR helicopter landed at the scene of accident, the patient was receiving bystander cardiopulmonary resuscitation. The patient was lying in a muddy trench next to the road. The pupils were dilated and did not react to light. It was impossible to hear heart sounds by auscultation because of the noise from the SAR helicopter performing low flight sweep of the area, using the Forward Looking InfraRed (FLIR) system, to identify one suspected missing person. The ultrasound was used by the SAR Physician to diagnose cardiac arrest and further treatment was terminated. The patient was declared dead on scene and the EMT personnel were released to participate in the ongoing search for the missing person and treatment of the second injured person.

CASE 2

A 75 year old male was evacuated from a small island, Laesoe, in the Kattegat Sea. He was reported with the symptoms of diffuse pain in the chest or upper abdomen. The 12 lead ECG recorded in the SAR helicopter showed no significant ischemia but was inconclusive with regard to diagnose myocardial infarction. The patient complained of central thorax pain and received sublingual Nitroglycerin and IV Morphine with relief of his pain. The ultrasound was used to perform a Focus Assessed Transthoracic Echocardiography (FATE), showing hypokinesia of the heart. According to the National Danish guidelines, the patient was immediately treated with Heparin, Clopidogrel and Aspirin and transferred to a University Hospital with a Cardiology Department.

DISCUSSION

Several authors have the last decade reported positive outcomes with the use of ultrasound in the prehospital setting. Polk and Brun et al concludes, that sonographic examinations during air-medical transport and ground based ambulances, are of similar quality and consistence as those obtained in the Emergency Department (1,2). An early diagnosis will provide the prehospital physician with the knowledge to prioritize the initial treatment and to choose the closest appropriate hospital (3, 4).

In a systematic review performed by Rudolph et al, they concluded that ultrasound used in the prehospital setting may lead to improvement in patient management with respect to diagnosis, treatment and hospital referral (4, 5). In Denmark, there is an ongoing implementation of ultrasound in the physicians staffed ambulances and HEMS units. There are several ongoing studies and one case report (6).

CONCLUSION

The two case reports show, that like on the physician staffed ambulances and HEMS units in Denmark, ultrasound on the SAR helicopter, is a valuable asset in the prehospital diagnosis and treatment. The two cases also shows, that correct diagnosis en route, may lead to reduced treatment delay, advanced life saving treatment and correct visitation to the final treatment facility.

REFERENCES

1. Polk JD, Geller WB Jr. The “F Hammel’s E A S T” for trauma patients the initial report of a novel application for sonography. Aviat Space Environ Med. 2001 May;72(5):432-6