

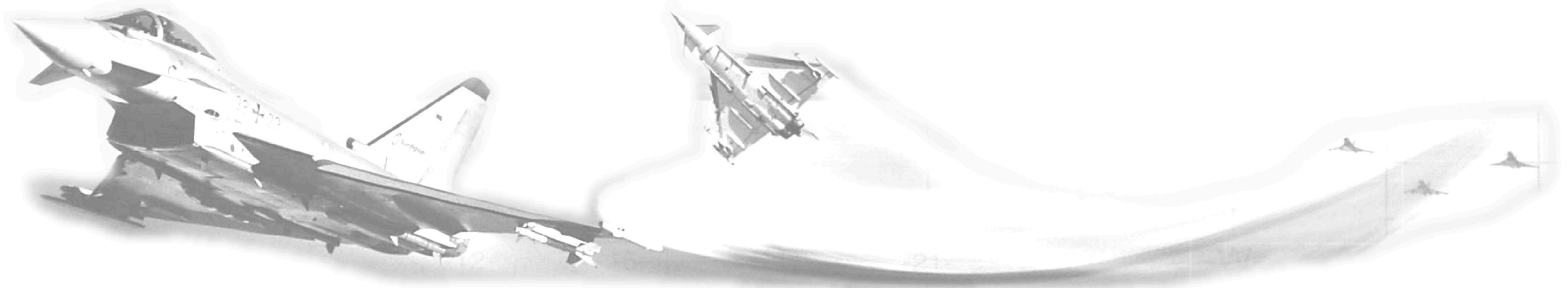


Air Force Centre of Aerospace Medicine



CARDIAC ARREST DURING HYPOBARIC CHAMBER TRAINING

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PROBLEM STATEMENT:

This case report describes an aircrew member who developed cardiac arrest in a hypobaric chamber. He experienced symptoms of hypoxia at an altitude of 25,000 ft and lost consciousness during the following descent to ground level. Medical monitoring showed a flat-line ECG lasting 30 seconds. A cardiac asystole under normoxic conditions is very unusual.

BACKGROUND/LITERATURE REVIEW:

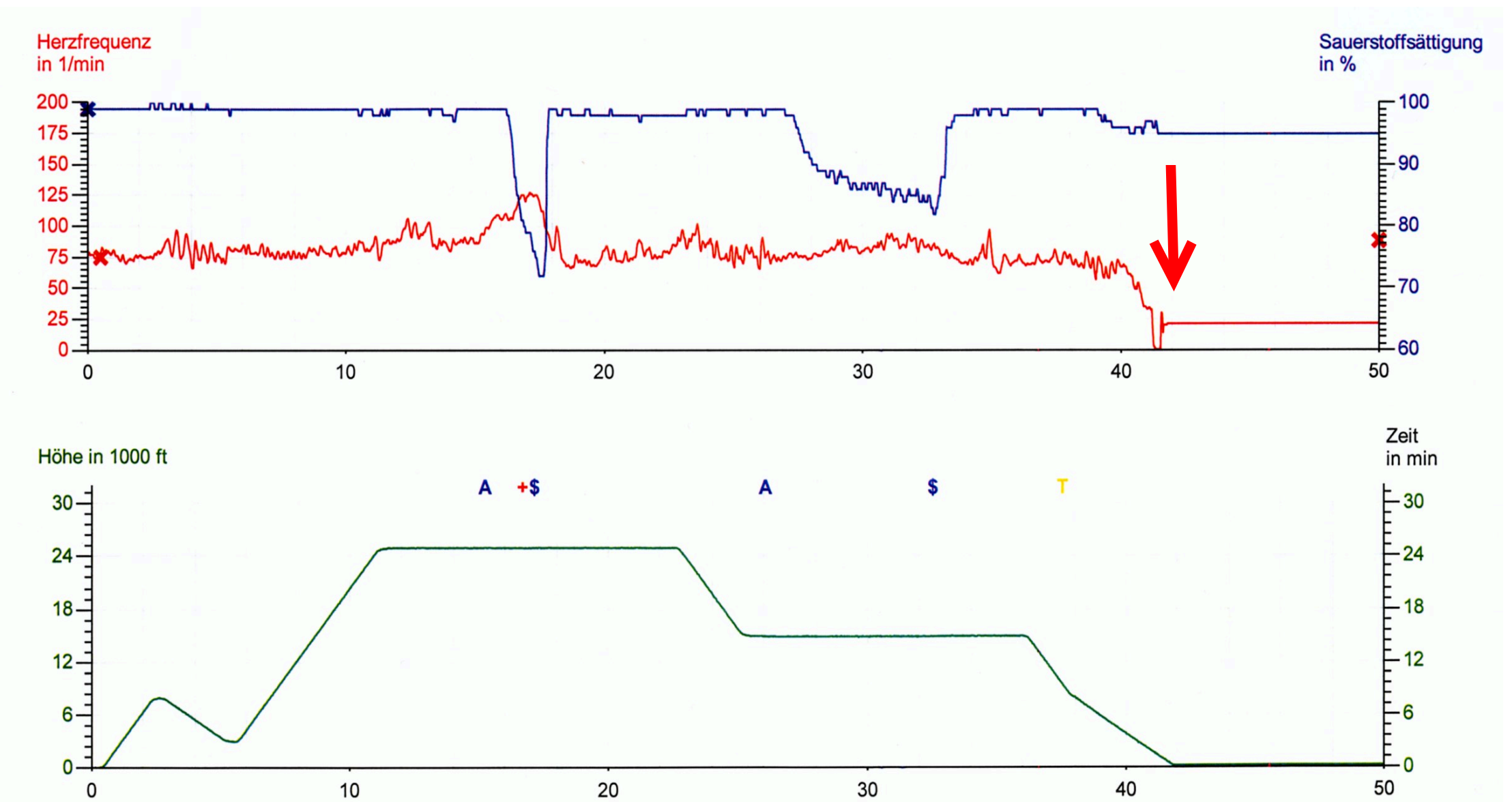
The objective of high-altitude training for aircrews is to make individual crew members aware of their individual symptoms of hypoxia. Syncope during high-altitude training, even if the subject is provided with oxygen, may have a number of causes. In some cases, subjects may lose consciousness after breathing in 100% oxygen (oxygen paradox) due to vasodilatation. Valsalva maneuvers to equalize the pressure in the middle ear could lead to unconsciousness. Expanding gas in the gastrointestinal tract may result in collapse. A cardiac arrest (asystole for 30 seconds) under these conditions is unusual.

CASE PRESENTATION:

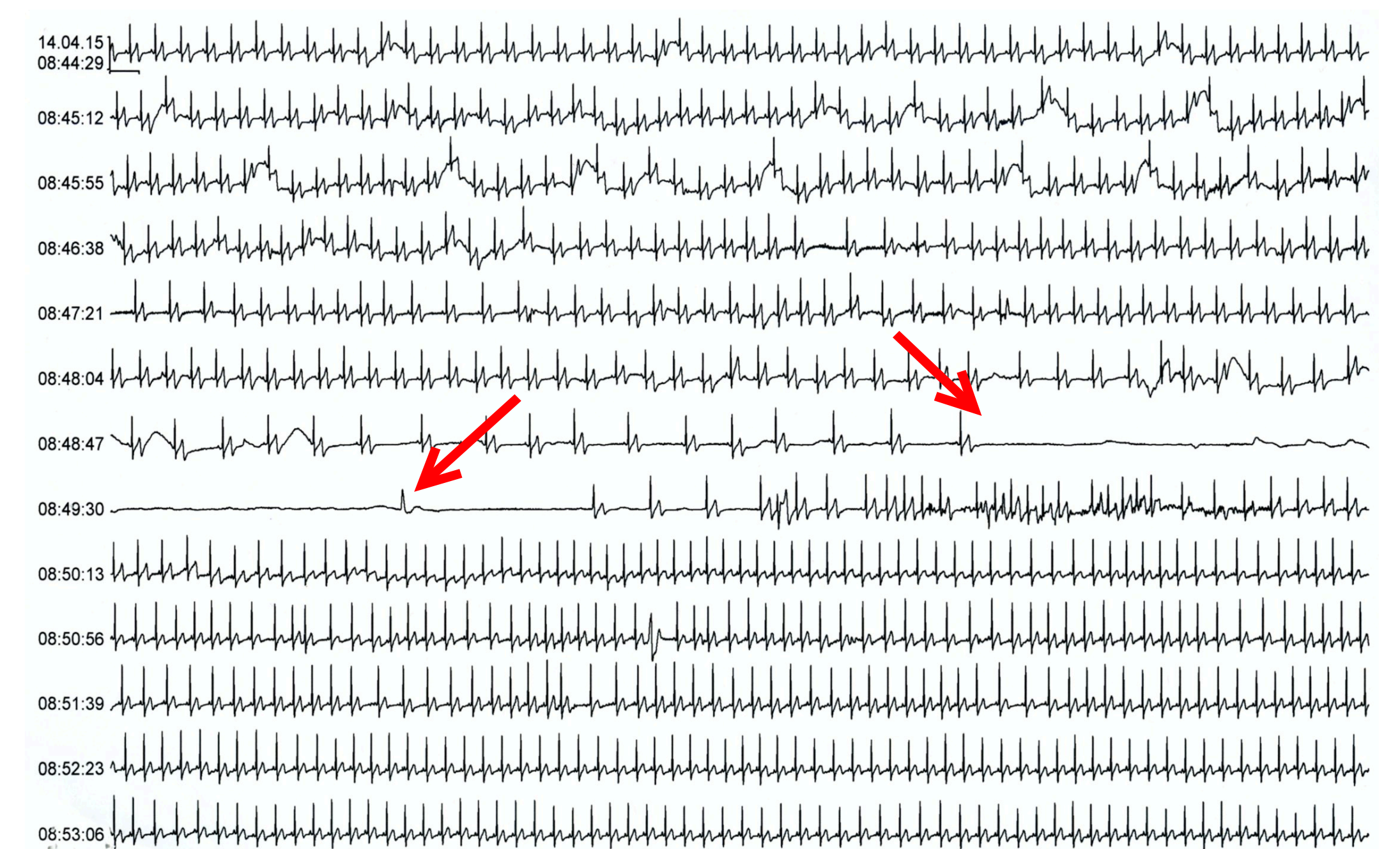
A 52-year old aircrew member underwent his refresher hypoxia training in a hypobaric chamber. He experienced symptoms of hypoxia at an altitude of 25,000 ft and reconnected to the 100% oxygen supply. At a descent altitude of 3,000 ft he complained about dizziness. Shortly afterwards he lost consciousness. The ECG showed bradycardia followed by asystole. The inside observer started resuscitation and after 30 seconds a normal sinus rhythm was restored. The patient regained consciousness and was transferred to the local hospital. He reported four syncope episodes in his lifetime, one of which suffered in flight. Further examinations resulted in the diagnosis of neurocardiogenic syncope. He finally ended his aviation career at his own request.

OPERATIONAL/CLINICAL RELEVANCE:

Neurocardiogenic syncope is a common phenomenon and triggered by a variety of circumstances. The triggering mechanisms are imperfectly understood. The aviation environment carries the risk of provocative factors. Certification of aircrews with neurocardiogenic syncope is problematic due to the risk of sudden incapacitation. In this case, the syncope happened twice in a hypobaric environment. Normally subjects with hypoxic syncope and cardiac asystole fully recover in Trendelenburg's position when supplied with supplemental oxygen. In this case, the oxygen saturation was 95% and the asystole lasted 30 seconds. Chamber personnel should be aware of the risk of asystole in aircrew members undergoing hypobaric chamber training. Medical monitoring (ECG, pulse oximetry) has proven to be very helpful. The inside observer must be able to perform cardiopulmonary resuscitation.



Asystole in a hypobaric chamber during descent to ground level



Flatline ECG for 30 seconds