Severe Anaemia from Exceptional Blood Loss

START IMMEDIATELY — a bridge, given while the cause is corrected

A temporising bridge that sustains tissue oxygenation on dissolved plasma oxygen when transfusion is unavailable, refused or impossible.

TREATMENT PROTOCOL

Pressure	**2.0–3.0 ATA** (200–300 kPa), reached rapidly
Duration	**3–4 hours** per session, with intra-treatment air breaks
Frequency	**Three to four times daily** while the anaemia is life-threatening
Sessions	Open-ended. Taper both length and frequency as the patient stabilises
Review	Qualitative — the manual sets no session-count trigger

PATIENT SELECTION

Who to treat	Life-threatening anaemia where transfusion is unavailable, refused on religious grounds, or impossible through alloimmunisation. **Trigger on clinical signs of systemic or end-organ failure, not on a calculated oxygen-debt figure.**
Who not to treat, or when to stop	**This is bridging only — it does not correct the anaemia.** The underlying blood loss must still be managed. Continue until red-cell mass is restored by regeneration or transfusion becomes possible.
Mechanism	Henry's law — at raised pressure enough oxygen dissolves in plasma to support metabolism largely independently of haemoglobin. Pulsed hyperoxia may also stimulate erythropoiesis.
Outcome measure	Survival and recovery; end-organ function (mental status, ECG, urine output); haemoglobin recovery.

WHAT THE NUMBERS SHOW

- **27 individually reported patients** (nadir haemoglobin 1.5–6.9 g/dL): **20 survived, 2 died, 5 have no stated outcome**. Nearly all also received erythropoietin, iron or an oxygen carrier, so HBO is never isolated.
- **Ueno 2011** (RCT, 41 analysed, post-hepatectomy Hb <9 g/dL, transfusion restricted): HBO at 2.0 ATA improved hepatic venous oxygen saturation and lactate, but **the same share was transfused (13/20 vs 13/21)**; complications and survival did not differ.
- **Van Meter 2005** (systematic review of 35 publications — **26 animal experiments, only 9 human case reports and series**): all 35 reported a positive result. No randomised trial exists, because the situation precludes randomisation.
- **Graffeo 2013** (case): full recovery at a haemoglobin of **1.9 g/dL** after 30 treatments in a patient refusing transfusion, alongside ventilation, vasopressors and dialysis.
- **Van Meter 2012**: one hyperbaric session costs approximately the wholesale price of one unit of packed red cells.

EVIDENCE BASE

Shape and certainty: Re-read in full on 29–30 Oct 2026 (about 240 linked records, many of them background on blood management). Human evidence is case reports and series plus one small randomised trial in post-hepatectomy anaemia; animal haemorrhagic-shock models add physiology. No randomised trial of HBO for life-threatening anaemia exists or can ethically exist. UHMS rates this **AHA Class IIb**; normobaric oxygen is Class I.

Study	Design	Result and risk of bias
Van Meter 2005 — PMID 15796315	SR: 26 animal + 9 human reports	All positive; AMSTAR-2 critically low
Graffeo 2013 — PMID 23380087	Case report	Survival at haemoglobin 1.9 g/dL
McLoughlin 1999 — PMID 10460565	Case report	Positive
Bell 2000 — PMID 10744564	Published correspondence	Contests mechanism, attribution, cost and declared interests
Ueno 2011, Langenbecks Arch Surg — PMID 21069381	RCT, n=45 (41 analysed)	Transfusion not reduced; RoB 2 some concerns
Kertscho 2012 — PMID 21883958	Pig RCT, n=14, normobaric O2	Death 7/7 vs 1/7
Sukhotnik 2002, Shock — PMID 12353931	Rat, four uncontrolled-bleeding models (normobaric oxygen)	Divergent: more blood loss in one model; SYRCLE some concerns

WHAT THE EVIDENCE DOES NOT SUPPORT

Cautions: No randomised trial exists or can exist — the rating stays Class IIb however many cases accumulate. The one randomised trial in surgical anaemia did not reduce transfusion (Ueno 2011). **Animal benefit is consistent only when HBO starts early in haemorrhagic shock**: in late traumatic shock HBO was toxic (Sherman 1989, abstract), and normobaric oxygen increased blood loss in an uncontrolled-bleeding model (Sukhotnik 2002) — **secure haemostasis first**. **Two frequently cited bloodless-medicine reviews (Posluszny 2014, Shander 2018) do not mention hyperbaric oxygen at all** and must never be cited as evidence for it; they describe the standard of care this treatment sits on top of.

STATUS AND SOCIETY POSITIONS

Status	Accepted indication in South Africa (NRPL-recognised); no dedicated SAUHMA protocol. Maps to the life-threatening anaemia diagnosis-treatment pair.
ICD-10 (SA)	D62, D64.9, D64.8
SAUHMA 2023	No protocol (NRPL-recognised; UHMS parameters used)
ECHM 2017 (Type, Level)	No recommendation issued

Compiled from the **UHMS Hyperbaric Oxygen Therapy Indications Manual, 15th edition (2023)** and the appraised trial evidence held in an HBOT evidence library. All treatments are 100% oxygen. US Navy Treatment Table profiles are named, not reproduced — the US Navy Diving Manual is the operative document at the chamber. Session counts are largely guideline convention rather than dose-finding evidence. This card summarises published parameters and does not replace those source documents or clinical judgement for the individual patient. Generated 31 October 2026. Not a SAUHMA publication and carries no society endorsement.