

analysis. Additionally, they identified 17 non-RCTs for analysis. The review does not support the use of AP in patients with basilar fractures, regardless of the presence of cerebrospinal fluid leakage. Furthermore, the results from non-RCTs were consistent with those from the randomized data.

A single-center case series with a systematic review, published in 2023, evaluated AP for penetrating traumatic brain injury. Although the literature review did not reveal any significant benefit of AP, all patients who did not receive AP developed CNS infection in their case series. Consequently, the authors proposed a short course of *therapeutic* antibiotics for patients with penetrating traumatic brain injury [181].

An evidence-based consensus statement from the Neurocritical Care Society conditionally recommends one dose of antimicrobials prior to EVD insertion and strongly recommends against the continuous use of antimicrobials during placement [182]. However, a recent retrospective cohort study did not demonstrate the benefit of AP in patients with EVDs or ICP monitors [183]. Given that the quality of the studies published to date on AP for skull fractures and EVD or ICP monitor insertion is insufficient, the effectiveness of AP in these populations cannot be determined and requires appropriately designed RCTs.

For other truncal trauma the recommendations follow that of clean contaminated surgery, namely that in general, no prophylaxis should be given to blunt trauma patients unless a hollow viscus injury is suspected or identified. Antibiotic prophylaxis for penetrating trauma should not last more than 24 h in the absence of hollow viscus injuries and broad-spectrum antibiotics with aerobic and anaerobic bacteria coverage are preferred while aminoglycosides should be avoided. In the case of hemorrhagic shock and associated acute kidney injury, the dose of antibiotics should be adjusted with a second dose if more than 4–6 units of blood are required [184]. With abdominal pathology, the presence of contamination, underlying physiology, and core temperature also impact the risk of SSI. For limb trauma, open fractures benefit from prophylaxis for no more than 24 h while prolonged prophylaxis is traditionally used in maxillo-facial trauma. Tetanus toxoid where appropriate and antiviral vaccines (e.g., rabies) should be used prophylactically if indicated. Where antibiotic therapy is given shortened (4–5 days) courses are preferred over longer (7–10 days) courses and are terminated early [184–186].

12. Summary and recommendations:

Antibiotic prophylaxis and duration: There is high quality evidence and numerous consensus guidelines to support perioperative prophylactic antibiotic therapy for maximally 24 h with appropriate re-dosing for extensive blood loss (4–6 units) and prolonged surgery (> 4 h). There is low evidence to extend antibiotic prophylaxis after 24 h in trauma and this should be considered on an individual basis and whether there is cavity contamination, giving short-course therapy in preference to long-course prophylaxis.

12a. 24-h maximal prophylaxis

Level of evidence: High

Recommendation grade: Strong

12b. Extension of Prophylaxis beyond 24 h: if needed use therapeutic course

Level of evidence: Moderate

Recommendation grade: Strong

4 | Aspects From Part 2 Relevant to Part 1

The following five PICO questions are detailed in part 2, but aspects thereof are relevant to initial management and are duplicated here in the form of a brief summary, with the relevant recommendation: The reader is referred to part 2 for the detailed literature discussion and related references.

15. Anesthesia

PICO: In cases requiring anesthesia for polytrauma and major trauma procedures what are the optimal balanced anesthesia options for best survival in this patient group?

Induction and maintenance of anesthesia and airway management carries a risk of cardiovascular collapse, especially in the hypovolemic patient. Fluid resuscitation should commence prior to induction of anesthesia in all hypotensive patients and those normotensive patients deemed to be significantly hypovolemic. Administration of anesthesia should be delayed until the operating theater or other point of hemorrhage control unless the patient's physiology mandates otherwise. Rational choices for administration of anesthesia are ketamine induction and maintenance outside the operating room with consideration of low dose volatile maintenance of anesthesia.

Level of evidence: Moderate

Recommendation grade: Strong

17. Abdominal Closure tray and glove changes

PICO: Does the type of hand-scrub or the changing of gloves and instruments on closure of open surgical sites reduce the surgical site sepsis?

There is high quality evidence to support changing of gloves and using a new set of instruments for definitive sheath closure in abdominal surgery, extrapolation to other surgical procedures can be cautiously advocated.

Level of evidence: Moderate

Recommendation grade: Weak

19a. Resuscitation/use of blood products and coagulation management