1. **Scope**

1.1 This guidance covers the management of major haemorrhage, and the application of items within the major haemorrhage packs.

2. **General information**

2.1 Major haemorrhage is a time critical presentation which requires immediate intervention to save lives. A major haemorrhage kit must be carried on all Double Crewed Ambulances, Rapid Response Vehicles, Air Ambulances and Responding Officer cars.

2.2 Items within the packs should be replaced according to the SOP - Replacing Major Haemorrhage Pack Items.

3. **Guidance**

3.1 **Major Haemorrhage Assessment**

3.1.1 The major haemorrhage algorithm detailed in Appendix 1 must be applied to determine the most suitable means of managing major haemorrhage, using a stepwise approach.
3.2 Pressure Dressing
3.2.1 The Olaes pressure dressing is included within the major haemorrhage kit and is indicated for use in any situation where there is haemorrhaging which may benefit from a pressure dressing.

3.2.2 An Olaes dressing should be seen as the first line of treatment and should be considered during the triage process in order to prevent deterioration of the patient’s condition.

3.2.3 It is imperative that the correct amount of pressure is used when applying the dressing, as an excess of pressure when applying the bandage may result in a tourniquet effect on the underlying limb.

3.2.4 Once an Olaes dressing is applied, continued circulation distal to the point of application must be monitored throughout its use. If any problems arise, the dressing should be relaxed and re-applied.

3.3 Haemostatic Gauze
3.3.1 Haemostatic gauze is included within the major haemorrhage kit; the initial issue of packs contained a Celox gauze dressing, whilst later packs contain ChitoGauze.

3.3.2 Haemostatic gauze can be used on any open wound when haemorrhage cannot be controlled by application of direct pressure alone, or wounds with soft tissue loss. It is of particular value in controlling haemorrhage at junctional areas where a tourniquet cannot be applied such as the groin, axilla and neck.

3.3.3 When used on facial wounds, care must be taken to avoid contact with the eyes.

3.3.4 Haemostatic gauze dressings should be used to pack the wound at the point of haemorrhaging. Cavities should be packed with gauze down to bone. It should not be blindly inserted into the thorax or abdomen if the terminal point of bleeding cannot be visualised.

3.3.5 Once in place, compression should be maintained, if possible with a pressure dressing, which should be applied circumferentially to the outer part of the gauze to assist in the application of pressure and to hold the gauze in situ.

3.3.6 Direct pressure should be applied for at least 3 minutes to allow a stable clot to form. Continued direct significant pressure may be required to control bleeding after application of haemostatic gauze dressings.
3.3.7 The dressing should be re-checked after moving the patient and on arrival at hospital, to ensure that haemorrhage control has been maintained. Leave haemostatic gauze and pressure dressings in situ until handover at hospital.

3.4 Arterial Tourniquet
3.4.1 Two arterial tourniquets are included within each major haemorrhage kit, with a further two carried in response bags within East and West Division (this provision will be reviewed during 2012-13). The CAT and SOF-T tourniquets are available and can be used interchangeably.

3.4.2 Arterial tourniquets are indicated for use in any situation where there is uncontrolled catastrophic haemorrhage from a limb that cannot be controlled by other means.

3.4.3 An arterial tourniquet can be utilised as a first line treatment and should be considered during the triage process, in order to prevent deterioration of a patient’s condition due to uncontrolled haemorrhage. Military experience advocates an initial Primary Survey CABCD approach, which treats uncontrolled catastrophic haemorrhage as a priority over initial airway assessment.

3.4.4 The tourniquet can also be applied in a pre-emptive way (un-tightened) prior to the release of a trapped limb where it is believed catastrophic haemorrhage may occur once the item trapping the limb is released. By doing this it can quickly be tightened should it be necessary.

3.4.5 For crush injury with prolonged entrapment, the tourniquet can also be applied in accordance with Clinical Guideline (CG09) - Crush Injury.

3.4.6 Application of a combat type tourniquet will alter the triage category of a patient to priority 1 (P1), irrespective of the patient’s clinical condition. This does not however affect the patient’s ability to extricate themselves under escort to a Casualty Collection Point for example. Should it have been applied to an arm, and the patient self mobilises to aid, they still require treatment of the catastrophic haemorrhage as soon as practicable and to have the tourniquet released under controlled medical conditions.

3.4.7 The tourniquet should be applied in line with manufacturer’s guidelines. It is imperative that the strap is passed through the correct part of the buckle, as failure to do so can cause slippage and ineffective haemorrhage control. The
tourniquet can be pre-threaded prior to application over a limb, and must be pulled tight to the skin before using the windlass bar.

3.4.8 The tourniquet can be positioned around 5cm above the site of injury as long as the application is on tissue sufficient to allow the tourniquet to remain in situ. Military experience has shown that to achieve haemorrhage control in patients with proximal lower limb amputation it may be necessary to apply a second tourniquet superior to the first, over a single bone.

3.4.9 CAT Application Instructions:
1) Route the band around the limb and pass the free-running end through the inside slit in the buckle;
2) Pass the band round the outside slit of the buckle;
3) Pull the band tight and securely fasten the band back on itself;
4) Twist the windlass rod until bleeding is controlled;
5) Lock the rod with the clip;
6) Secure the rod with the strap.

3.4.10 SOF-T Application Instructions:
1) Apply around limb;
2) Clip buckle together and tighten strap;
3) Twist windlass until bleeding is controlled;
4) Secure windlass in tri-ring.

3.4.11 The time of application of the tourniquet must be recorded on the patient clinical record and handed over with the patient. The time must also be written on the patient’s skin or on the velcroTM tab, annotated as T= (time of application).

3.4.12 The tourniquet should be tightened until bleeding has stopped. The tourniquet should be continuously re-assessed and if bleeding re-occurs then it must either be retightened until bleeding stops, or consideration given to applying a second tourniquet as detailed in Para 3.4.8.

3.5 Chest Dressing
3.5.1 A chest dressing is included within the major haemorrhage kit; the initial issue of packs contained a Nightingale dressing, whilst later packs contain the Russell chest seal. A chest dressing is indicated for an open chest wound, particularly a penetrating injury with the potential of developing into a sucking chest wound.
3.5.2 Irrespective of which dressing is provided, both will completely seal the chest wall, significantly improving the ability of the lungs to ventilate. The Russell dressing also includes a one way valve. Due to the nature of the material, the seal is unaffected by fluids and moisture.

3.5.3 When considering the use of the chest dressing, the future development of a tension pneumothorax is a risk that needs careful observation, and the ability to detect and treat a tension pneumothorax should be immediately available. Military experience is that the improved ventilation from sealing the chest wall defect is a significantly more frequent result than the creation of a tension pneumothorax.

3.5.4 Both dressings should be applied in line with manufacturer’s guidelines and adhered directly to the skin over the point of injury on the patient’s chest. Prior to application, attempts should be made to clean the skin of dirt, debris and fluids to maximise adhesion. Care must be taken to wipe away from the site of injury to prevent ingress of contamination into the open wound.

3.5.5 Regular observation to detect a potential tension pneumothorax is essential; if a tension pneumothorax develops, a needle thoracocentesis should be performed.

4. Documentation
4.1 In line with Trust Policy, a Patient Clinical Record must be completed and annotated appropriately. Any deviation from this guideline must be recorded, with any potential or actual adverse event reported through the incident reporting system.
Appendix 1: Major Haemorrhage Algorithm

**Catastrophic Haemorrhage**

- **Open Chest Injury**
  - Apply chest dressing
  - Monitor for signs of developing tension pneumothorax. Decompress chest if indicated.
- **Head, Neck, Torso**
  - Apply a field dressing
  - Apply direct pressure
- **Limb(s)**
  - Apply a tourniquet as low as possible to the bleeding point
  - Bleeding controlled
  - Pack with haemostatic gauze, apply fresh dressings and direct pressure
  - Bleeding NOT controlled
    - Bleeding controlled
    - Apply further dressings and direct pressure
    - Secure dressing over wound
    - Bleeding NOT controlled
      - Pack with haemostatic gauze, apply fresh dressings and direct pressure
      - Apply a second tourniquet above the first - check it is properly applied before releasing the first

Convey to appropriate hospital as detailed in Clinical Guideline (CG24) - Trauma Care: Accessing Trauma Services