Secondary blast injury

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Secondary blast injury refers to the e ff ect of fragments that are accelerated away from the device following detonation. Sources of fragments include: /uni25CF the casing of the device; /uni25CF purposefully placed fragments within the device; these may include nails, bolts or ball bearings and are embedded within the device or adherent to the exterior; /uni25CF nearby objects including glass and stones; - - - - - /uni25CF biological material including bone may be expelled, par - ticularly following a suicide bomb or antipersonnel mine attack. Shrapnel is often used to describe explosive fragments, although the term is more strictly applied to a specific form of artillery shell. The energ y of a primary blast wave disperses quickly in proportion to the distance from the blast; it is subject to the inverse cube law . As such, only those within a reasonably small radius of the blast are a ff ected. Conversely , the velocity and w ounding potential of an energised fragment are subject to the inverse square law . Secondary blast injuries may occur at long range from the detonation. Fragments may be accelerated up - to very high velocities. As with ballistics, injuries are dependent on the range and energy of the fragment. In contrast to bullet wounds, the variability of fragments produces a wide range of wounds and no two wounds will be the same (Figure 34.5). The irregular surfaces of fragments cause complex patterns of yaw and tumb le. Both permanent - and temporary wound cavities may be unpredictable and irregular. The management of fragment wounds is similar to ballis - - tic and conventional penetrating trauma. Wounds should be adequately debrided. Fragment wounds should be considered dirty and principles of septic surgery applied. Where possi - - ble, serial debridement and delayed primary closure should be attempted. The fragments should be remo ved at the time of surgery if easily accessible. Other indications for early remov al include fragments within joint spaces or adjacent to structures with danger of erosion and further injuries. Late indications for fragment remo val include ongoing sepsis, pain or lack of func - tion.

Large anterior fragmentation injury. Figure 34.5

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