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remains the urine output. However, this is an hourly measure and does not give a minute-to-minute view of the shocked state. The level of consciousness is an important marker of cerebral perfusion, but brain perfusion is maintained until the very late stages of shock and hence is a poor marker of adequacy of resuscitation (Table 2.4). Currently , the only clinical indicators of perfusion of the gastrointestinal tract and muscular beds are the global Christian Johann Doppler , 1803–1853, Professor of Experimental Physics, Vienna, Austria, en mixed venous oxygen saturation. Base deficit and lactate Lactic acid is generated by cells undergoing anaerobic respi - - ration. The degree of lactic acidosis, as measured by serum lactate level and/or the base deficit, is sensitive for both diagnosis of shock and monitoring the response to therapy . Patients with a base deficit of more than 6 /uni00A0 mmol/L have a much higher morbidity and mortality than those with no metabolic acidosis. Furthermore, the length of time in shock - with an increased base deficit is important, even if all other vital signs have returned to normal (see occult hypoperfusion below under End points of resuscitation). These parameters are measured from arterial blood gas analyses, and therefore the frequency of measurements is limited and they do not pr ovide minute-to-minute data on systemic perfusion or the response to therapy . Nevertheless, the base deficit and/or lactate should be measured routinely in these patients until they have returned to normal levels. - - Mixed venous oxygen saturation The percentage saturation of oxygen returning to the heart from the body is a measure of the oxygen delivery and extraction by the tissues. Accurate measurement is via analysis of blood drawn from a long central line placed in the right atrium. Estimations can be made from blood drawn from lines in the superior vena cava, but these values will be slightly higher than those of a mixed venous sample (as there is rela - tively more oxygen extraction from the lower half of the body). Normal mixed venous oxygen saturation levels are 50–70%. Levels below 50% indicate inadequate oxygen delivery and increased oxygen extraction by the cells. This is consistent with hypovolaemic or cardiogenic shock. High mixed venous saturations (>70%) are seen in sepsis and some other forms of distributive shock. In sepsis, there is disordered utilisation of oxygen at the cellular level and unciated the Doppler principle in 1842.

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