

# POSTOPERATIVE COMPLICATIONS

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Postoperative complications are an important cause of morbidity, mortality, extended hospital stay and increased costs. Most patients at increased risk of developing postoperative complications can be identified prior to surgery at the preoperative assessment clinic using a variety of scoring systems (for example the American College of Surgeons National Surgical Quality Improvement Program surgical risk calculator for a patient's risk of postoperative complications [ACS NSQIP], as discussed in Chapter 21). Early identification of risk allows for targeted, appropriate, anticipatory and supportive medical care, which will reduce both the incidence and severity of such complications when they occur. The Clavien–Dindo classification of postoperative complications (Table 24.1) is used to objectively and reproducibly measure the impact of surgical complications on the outcome of the procedure. Complications are graded according to the treatment they require. This eliminates subjective bias and prevents complications from being downgraded. Complications can occur throughout the postoperative period. However, certain complications are more common earlier in the postoperative period than others, as shown in Figure 24.3. Postoperative complications can be further classified into system-specific and surgery-specific complications.

**TABLE 24.1 Clavien–Dindo classification of postoperative complications.** Grade Definition  
 I Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic or radiological intervention. Acceptable therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside.  
 II Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.  
 III Requiring surgical, endoscopic or radiological intervention.  
 IIIa Intervention not under general anaesthesia  
 IIIb Intervention under general anaesthesia  
 IV Life-threatening complication (including CNS complications, e.g. brain haemorrhage, but excluding TIAs) requiring ICU management.  
 IVa Single-organ dysfunction (including dialysis)  
 IVb Multiorgan dysfunction  
 V Death of a patient.  
 CNS, central nervous system; ICU, intensive care unit; TIA, transient ischaemic attack.  
 Superficial surgical site infection  
 Deep/organ space site infection  
 Surgical site infection  
 Venous thromboembolism  
 Myocardial infarction  
 Kidney injury/failure

Grade	Incidence estimates (per 10 000 patient-days)
I	0–10
II	10–20
III	20–30
IV	10–15
V	5

Figure 24.3 Timing and incidence of postoperative complications. Modified from Hyder JA, Wakeam E, Arora V et al. Investigating the “Rule of W,” a mnemonic for teaching on postoperative complications. *J Surg Educ* 2015; 72 (3): 430–7.

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TABLE 24.1 Clavien–Dindo classification of postoperative complications. Grade Definition I Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic or radiological intervention Acceptable therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside II Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included III Requiring surgical, endoscopic or radiological intervention IIIa Intervention not under general anaesthesia IIIb Intervention under general anaesthesia IV Life-threatening complication (including CNS complications, e.g. brain haemorrhage, but excluding TIAs) requiring ICU management IVa Single-organ dysfunction (including dialysis) IVb Multiorgan dysfunction V Death of a patient CNS, central nervous system; ICU, intensive care unit; TIA, transient ischaemic attack. Superficial surgical site infection surgical site infection Venous thromboembolism Myocardial infarction Kidney injury/failure 25 20 15 10 5 Incidence estimates (per 10 000 patient-days) 0 0 10 20 30 Postoperative day Figure 24.3 Timing and incidence of postoperative complications. Modified from Hyder JA, Wakeam E, Arora V et al. Investigating the “Rule of W,” a mnemonic for teaching on postoperative complications. *J Surg Educ* 2015; 72 (3): 430-7.

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