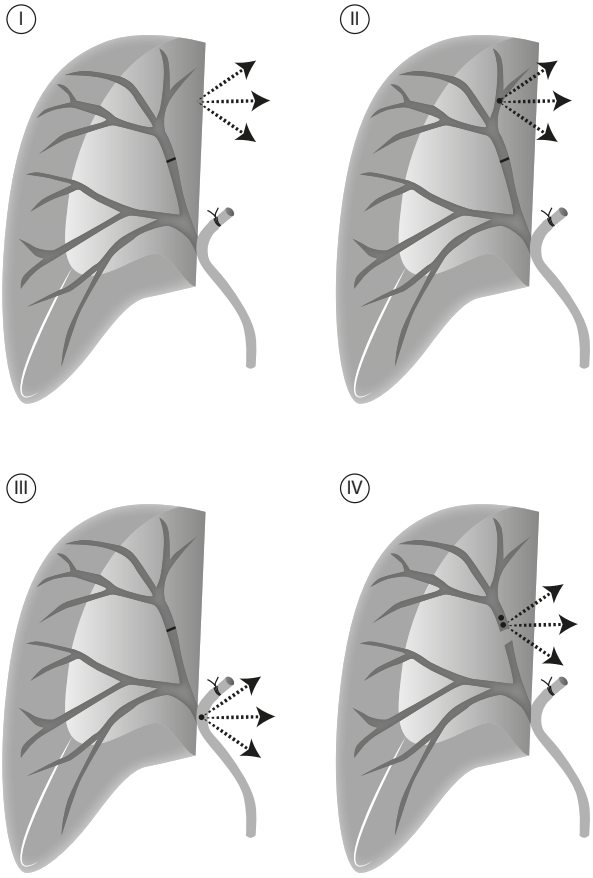
Table 13.1. Postoperative biliary leakage after liver resections without primary biliodigestive anastomose.

Author	Year	Risk factors	(n)	Incidence
Ijichi et al.[33]	2000	N/a	103	4.9% (3+2/103)
Paquet et al. [34]	2000	N/a	167	5.4% (9/167)
Yamashita et al. [35]	2001	1. High risk resection (cental segmentectomy or bisegmentectomy or caudate lobe resection) (b) 2. Operation time (a) 3. Bloodlost (a)	781	4.0% (31/781)
Tanaka et al. [36]	2002	CCC (a)	363	7.2% (26/363)
Nagano et al. [37]	2003	1. High risk resection (cental bisegmentectomy, resection of segment 4, 8 or subsegmentectimy (a) 2. Resetionsurface (a) 3. Higher age (a)	313	5.4% (17/313)
Capussotti et al. [38]	2006	1. Peripheral CCC (b) 2. Resection of segment 4 (b) 3. Non-use of fibrin glue (b) 4. Cirrhosis (a) 5. Major resections (a) 6. Left lobectomy (a) 7. Any resections with segment 4 (a)	610	3.6% (22/610)
Reed et al. [30]	2003	N/a	74	12.2% (9/74)
Yoshioka et al. [39]	2011	1. multiple hepatectomy (b) 2. traumatized liver surface ≥ 57.5 cm (b) 3. intraoperative bleeding ≥ 775 mL (b)	505	6.7% (34/505)
Sadamori et al. [40]	2012	operative time ≥ 300 min	359	12.8% (46/359)

N/a - not available; (a) - univariant significance (multivariate not significant or not estimate); (b) - multivariate significance; CCC - cholangiocarcinoma

[41]. In addition, the inflammatory reaction caused by the bile leak may also lead to liver regeneration disorders, which has already been proven in animal experiments. 6 Interventional procedures is the treatment of choice for bile leak. Appropriate minimally invasive procedure allow to resolve postoperative biliary fistula in 90% cases [37, 38]. To better surface control before wound closure Sadamori et al. [40] propose to

Figure 13.1.



Classification of postoperative biliary fistula by Nagano et al. [37].

cover transactional surface with wet gauze, which may show the presence of minimal bile seepage. To help avoid postoperative bile leakage, biological glue can be applied to the surface of the residual liver, and a C tube can be placed in the cystic duct for decompression [43]. Intraoperatively, bile leakage might be revealed with the use of indocyanine green fluorescein [44]. Close postoperative monitoring is mandatory and should include observing for abdominal pain, rebound tenderness, muscle tension, and bile leakage from the drainage tube. Bile leakage also may be evident by the presence of bile in the peritoneal drainage (the concentration of bilirubin in the bile will be higher than in serum). In addition, computed tomography (CT) visualization can be used to determine if the bile duct is occluded and, if so, where the occlusion is located. A drainage tube can remain in the bile duct if there is no sign of peritonitis; the bile leakage may resolve spontaneously within two months. However, if peritonitis develops, open surgery should be performed as soon as possible for thorough cleaning