Table 1 Classification systems of bile duct injuries

Classification system (with year of publication)	Basis of classification	Type/class of injury				
Bismuth-Corlette (1982)	Location of stricture	Type 1: Low CHD stricture, with a length of the common hepatic duct stump of >2 cm	Type 2: Proximal CHD stricture-hepatic stump <2 cm	Type 3: Hilar stricture, no residual CHD but the hepatic ductal confluence is preserved	Type 4: Hilar stricture, with involvement of confluence and loss of communication between right and left hepatic duct	Type 5: Involvement of aberrant right sectorial hepatic duct alone or with concomitant stricture of the CHD
Siewert (1994)	Time to detection, type of injury; vascular lesions	Type I: immediate biliary fistulae of usually good prognosis	Type II: late strictures without obvious intraoperative trauma to the duct	Type III: tangential lesions without structural loss of the duct. IIIa: with additional lesion to the vessels; IIIb: without additional lesion to the vessels	Type IV: lesion with a structural defect of the hepatic or common bile duct. IVa: with additional lesion to the vessels; IVb: without additional lesion to the vessels	

Strasberg (1995)	Location of injury	Type A: Bile leak from cystic duct stump or small biliary ducts in gallbladder fossa	Type B: occlusion of part of the biliary tree, commonly aberrant right hepatic duct(s)	Type C: bile leak from divided right posterior sectoral duct	Type D: bile leak from main bile duct	Type E: injury to the main hepatic duct: E1: injury > 2 cm below the confluence; E2: injury < 2 cm below the confluence; E3: injury at the confluence with preserved communication between left and right ducts; E4: injury above or at the biliary confluence with no communication between left and right ducts; E5: injury to the

						aberrant right hepatic duct as well as the main duct
McMahon (1996)	Severity of damage	Major bile duct injury (at least one of the following present): Laceration > 25 per cent of bile duct diameter; transection of common hepatic duct or CBD; development of postoperative bile duct stricture	Minor bile duct injury: Laceration of CBD < 25 per cent of diameter; laceration of cystic-CBD junction ('buttonhole' tear)			
Amsterdam Academic Medical Center or Bergman (1996)	Type and level of injury	Type A: Cystic duct leaks or leakage from aberrant or	Type B: Major bile duct leaks with or without concomitant	Type C: Bile duct strictures without bile leakage	Type D: Complete transection of the duct with or without excision of some	

		peripheral hepatic radicles	biliary strictures		portion of the biliary tree	
Neuhaus (2000)	Type and level of injury	Type A: Peripheral bile leak (in communication with the CBD). A1: Cystic duct leak; A2: Bile leak from the liver bed	Type B: Occlusion of the CBD (or right respectively left hepatic duct, i.e. clip, ligation). B1: incomplete; B2: complete	Type C: Lateral injury of the CBD. C1: small lesion (< 5 mm); C2: extended lesion (> 5 mm)	Type D: Transection of the CBD (or right hepatic duct not in communication with the CBD). D1: without structural defect; D2: with structural defect	Type E: Stenosis of the CBD. E1: CBD with short stenosis (< 5 mm); E2: CBD with long stenosis (> 5 mm); E3: confluence; E4: right hepatic duct or segmental duct
Stewart-Way (2004)	Mechanism and level of injury	Class I: CBD mistaken for cystic duct, but recognized. Cholangiogram incision in cystic duct extended into CBD	Class II: Lateral damage to the CHD from cautery or clips placed on duct. Often associated bleeding, poor visibility	Class III: CBD mistaken for cystic duct, not recognized CBD, CHD, or right or left hepatic ducts transected and/or resected	Class IV: RHD mistaken for cystic duct, RHA mistaken for cystic artery RHD and RHA transected. Lateral damage to the RHD from cautery or clips placed on duct	

Hannover (2007)	Type and level of injury and vascular lesions	Type A: Peripheral bile leak (with reconnection to the main bile duct system). A1: Cystic duct leak; A2: Leak in the region of the gallbladder bed	Type B: Stenosis of the main bile duct without injury (*i.e.* caused by a clip). B1: Incomplete; B2: Complete	Type C: Tangential injury of the common bile duct. C1: Small punctiform lesion (< 5 mm); C2: Extensive lesion (> 5 mm) below the hepatic bifurcation; C3: Extensive lesion at the level of the hepatic bifurcation; C4: Extensive lesion above the hepatic bifurcation. With vascular lesion (*i.e.* C1d. C2. *etc.*). D: right hepatic artery; s: left hepatic artery; p: proper hepatic	Type D: Completely transected bile duct. D1: Without defect below the hepatic bifurcation; D2: With defect below the hepatic bifurcation; D3: At hepatic bifurcation level (with or without defect); D4: Above the hepatic bifurcation (with or without defect). With vascular lesion (*i.e.* D1d. D2pv. *etc.*) D: right hepatic artery; s: left hepatic artery; p: proper hepatic artery; com:	Type E: Strictures of the main bile duct. E1: Main bile duct short circular (< 5 mm); E2: Main bile duct longitudinal (> 5 mm); E3: Hepatic bifurcation; E4: Right main bile duct/segmental bile duct

				artery; com: common hepatic artery; c: cystic artery; pv: portal vein	common hepatic artery; c: cystic artery; pv: portal vein
ATOM (2013)	Anatomy, time to detection and mechanism of injury	A (Anatomy): Describes the anatomical characteristics of the injury, such as non-main bile duct or main bile duct, followed by a number indicating the level of injury, and additional descriptors like occlusion (Oc), division (D), partial (P),	To (time of detection): Indicates when the injury was detected, such as early intraoperative (Ei), early postoperative (Ep), or late (L)	M (mechanism): Describes the mechanism of injury, such as mechanical (Me) or energy-driven	

	complete (C), loss of substance, and vasculobiliary injury

CBD common bile duct; CHD common hepatic duct; RHD right hepatic duct; RHA right hepatic artery.

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Recent classifications of the common bile duct injury

Kwangsik Chun [1,✉]

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Figures and Tables

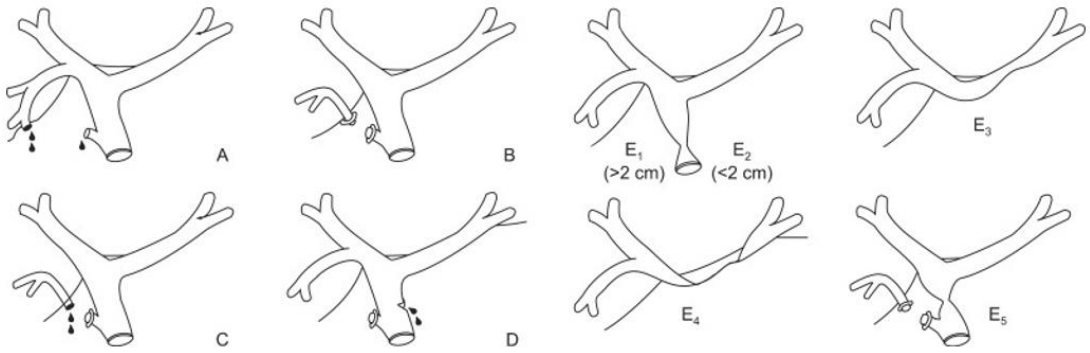

Figure 1 Strasberg classification[15]. A: Bile leak from cystic duct stump or minor biliary radical in gallbladder fossa; B: Occluded right posterior sectoral duct; C: Bile leak from divided right posterior sectoral duct; D: Bile leak from main bile duct without major tissue loss: E_1: Transected main bile duct with a stricture more than 2 cm from the hilus; E_2: Transected main bile duct with a stricture less than 2 cm from the hilus; E_3: Stricture of the hilus with right and left ducts in communication; E_4: Stricture of the hilus with separation of right and left ducts; E_5: Stricture of the main bile duct and the right posterior sectoral duct. Citation: Chun K. Recent classifications of the common bile duct injury. *Korean J Hepatobiliary Pancreat Surg* 2014; 18: 69-72. Copyright© The author(s) 2014. Published by The Korean Association of Hepato-Biliary-Pancreatic Surgery (Supplementary material).

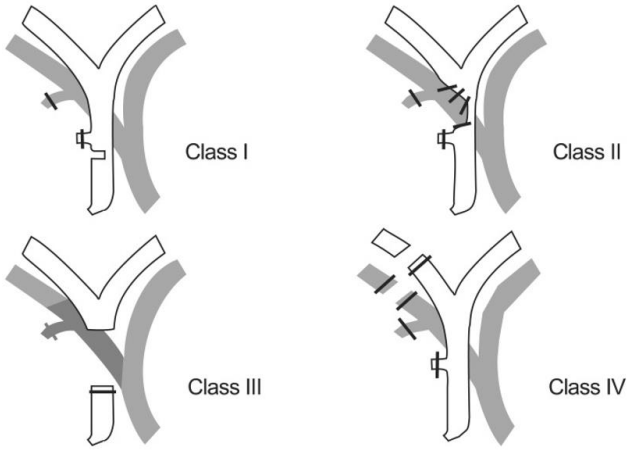

Figure 2 Stewart-Way classification[15]. Citation: Chun K. Recent classifications of the common bile duct injury. *Korean J Hepatobiliary Pancreat Surg* 2014; 18: 69-72. Copyright© The author(s) 2014. Published by The Korean Association of Hepato-Biliary-Pancreatic Surgery (Supplementary material).

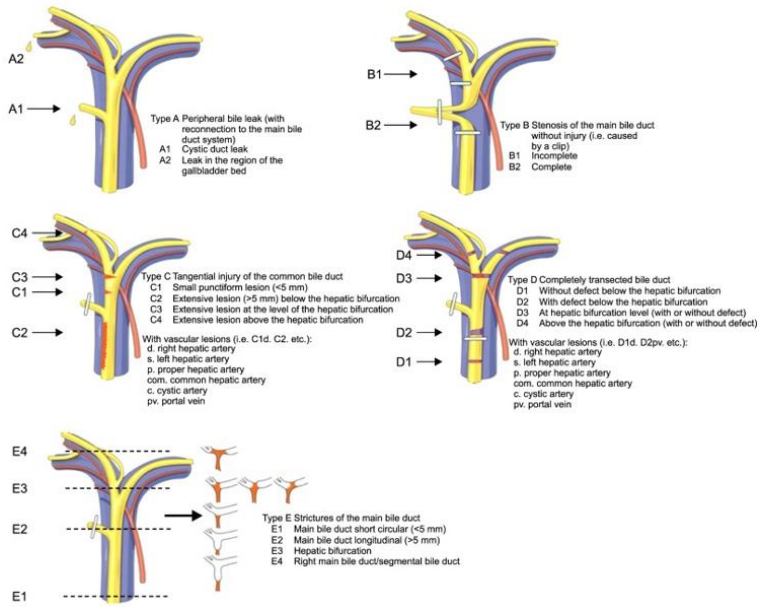

Figure 3 Hannover classification[15]. Citation: Chun K. Recent classifications of the common bile duct injury. *Korean J Hepatobiliary Pancreat Surg* 2014; 18: 69-72. Copyright© The author(s) 2014. Published by The Korean Association of Hepato-Biliary-Pancreatic Surgery (Supplementary material).