Preoperative Biliary Drainage

One of the most important factors of morbidity in hilar cholangiocarcinoma is the presence of jaundice as a consequence of physiopathologic changes following cholestasis, described in Chap. “Preoperative Assessment of Liver Function”. The close association of this complex disease with high operative risk, determined by increased postoperative mortality and morbidity, has led to the belief that preoperative drainage of jaundice would have decreased the risk of a major resection (i.e. pancreaticoduodenectomy or hepatic resection).

In fact, the first retrospective [1–3] and randomized studies [4] after percutaneous drainage and endoscopic stent [5] showed decreased mortality and in some cases morbidity in jaundiced patients who had been drained. Nevertheless, controlled randomized studies [6–8] and more recent studies [9–11] showed not only a lack of significant advantages but even an increased mortality in drained patients [12]. However, it is important to underline that in all these studies patients who underwent hepatic resection were few since most underwent pancreaticoduodenectomy for pancreatic or periampullary disease.

Recent prospective studies with larger series [12–16] offer variable results regarding the comparison drained/not drained: from the absence of significant differences in mortality and morbidity [15] to an increased rate of wound infection with unchanged mortality [13,14,16] to a significant increase in complications (specifically, infective and abscess) and fourfold increased mortality in drained patients [12]. Even a recent published meta-analysis on the worth of preoperative biliary drainage shows that percutaneous transhepatic biliary drainage (PTBD) for neoplastic jaundice would not provide clear benefits and should not be carried out routinely [17]. The probable advantages of PTBD regarding percentage of mortality and morbidity do not appear to balance the procedure’s disadvantages. The metanalysis concludes that controlled randomized studies and a better drain technique are necessary in order to correctly define the problem; another point is that jaundice in patients with hilar cholangiocarcinoma who are candidates for major liver resection presents different problems than jaundice in patients who are candidates for pancreaticoduodenectomy; for this reason specific randomized studies are required.
In the cited meta-analysis the number of patients with hilar cholangiocarcinoma were 34 of 312 patients (11%) in randomized studies, while the number was 113 of 372 patients (30%) in non-randomized studies [17]. Only one randomized study [10] and two non-randomized studies [18,19] consider the role of PTBD in patients with proximal cholangiocarcinoma. All three studies do not show advantages of PTBD; however the authors of the meta-analysis underline that the data reported are not sufficient for a correct analysis [17]. Figueras [19] reports a morbidity rate of 100% in the 11 drained patients vs. 66% in the 9 non-drained patients ($p=0.8$) and a postoperative hospitalization time that is longer in drained patients (25 vs. 13 days, $p=0.009$).

**Drainage: Pros**

Considerations derived from these studies lead to the hypothesis of a change in trend that will determine a radical reduction in preoperative drainage [12] or at least a restriction based on the following precise indications [13–17,20,21]:

– Need to resolve cholangitis
– Need to avoid exacerbation of severe jaundice while awaiting completion of the workup
– To correct severe malnutrition
– To improve jaundice-related renal or hepatic insufficiency
– To plan neoadjuvant treatment
– To improve hypertrophy of the remnant liver after PVE

Mean duration of preoperative biliary drainage is 2 weeks and in the literature it varies from 12 to 26 days in randomized studies and from 10 to 32 days in non-randomized studies [17]; at the end of this period the values of bilirubinemia are reduced on average to one-fourth of the initial value. An absent or slow decrease in bilirubinemia suggests a malfunction of the drainage or impaired liver function. The abovementioned timing and bilirubinemia values in patient candidates for pancreaticoduodenectomy can be considered adequate; however, in patients who are destined for hepatobiliary resection it is mandatory to re-establish bilirubinemia levels under 2 mg/dL as well as hepatic function, which requires 4–6 weeks as previously shown.

In literature many studies show that hepatic resection in jaundiced patients is associated with significant morbidity and mortality rates consequent to haemorrhage, subphrenic abscesses secondary to biliary leak, sepsis and hepatic insufficiency [22–25]. For these reasons and to increase resectability and feasibility of major hepatectomy many authors (mainly Asian) prefer to perform PTBD routinely [26–29]. Even Belghiti [30], following Japanese indications, has observed that preoperative PTBD increases resectability rate; in fact dividing his series in two different time periods he noticed that in the first period (1992–1995) 39% of 31 patients underwent PTBD and resectability rate was 32% (10 of 31 patients), vascular resection/reconstruction was performed in