by planned loss of vascular supply during surgery. Caudate lobectomy was planned and carried out routinely. Included hepatic segments were S1, S4a and S5-8.

Hepatic transection was accomplished using modified hanging maneuver with a Kelly clamp crushing technique. A small platic tube was placed retroheptically in the cut plane. The top of the tube was placed between the middle and right hepatic veins. Then, the tube was placed along the border between the left lateral section and Spiegel's caudate lobe (along ductus venosus), and the bottom of the tube was placed at the right side of the umbilical Glissonian pedicle (or the medial side of portal vein of the umbilical portion). During the parenchyma transection, the cut plane will always target to the tube under lifting up the tube by hanging. The left bile duct remained the last step to transect. The area of proximal liver hilum remained untouched in the whole procedure and will be resected en bloc after liver parechchyma transection.

Vascular resection

Concomitant portal vein resection and reconstruction have been applied aggressively when macroscopic invasion was suspected at surgery. As some controversial problems remain, concomitant hepatic artery resection and reconstruction have not been applied similarly as portal vein resection. The portal vein will be transected and anastomosed in the early phase of skeletonization of hepatoduodenal ligament, and reconstruction was performed by end-to-end anastomosis or the use of inter-position graft, bovine pericardial patch or PTFE, in specific cases.

Lymphadenectomy

Lymphadenectomy has included lymph nodes, lymphatic channels and nerves surrounding the portal vein and hepatic artery in all patients. All the regional lymphatic tissues were dissected and the sampling of para-aortic nodes (No. 16 a2 & b1) and retropancreatic lymph nodes (No. 13) was taken in most patients. In elderly patients (aged > 75 years) or patients with significant cardiopulmonary comorbidity, lymphadenectomy has been limited to the regional nodes in an attempt to reduce the risk for perioperative mortality.

2. Extended resection

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3. Limited resection

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Both curative resection and acceptably low perioperative mortality offer the chance of long-term survival in patients with hilar cholangiocarcinoma. The resectability rate for hilar cholangiocarcinoma has increased through concurrent major hepatectomies, but these procedures are technically demanding and often associated with serious complications. Parenchyma-preserving limited hepatectomy (PPLH) has a definite merit on patient safety, but surgical procedure becomes more complex.

PPLH was performed in 15 patients with advanced perihilar cholangiocarcinoma by a single surgeon. Their medical records were analyzed retrospectively.

The types of PPLH included resection of S4+1 (n=10), S5+4a+1(n=2), S5+4+1 (n=2) and isolated S1 (n=1). R0 resection was achieved in 12 patients. Concurrent pylorus-preserving pancreatectomy and extended bile duct resection with excavation of the intrapancreatic bile duct was performed in 3 and 5

cases, respectively. There was neither mortality nor major morbidity, but prolongation of minor bile leak up to 1 month was observed in 3 patients. Their 5-year survival rate was around 40%, which is quite similar to 47% in our R0 major hepatectomy group (n=214). Two significant risk factors affecting survival after resection were lymph node metastasis and curability of surgery.

Major hepatectomy offers an improved survival with a higher possibility of curative resection than PPLH, but it still carries a risk of non-negligible major morbidity and mortality. Less extensive procedures can be conducted safely and beneficially for old-aged patients with poor general condition and less advanced tumor stage if tumor-free resection margins are obtainable.