An anatomical study of the lymphatic drainage of the gallbladder

M Ito¹, Y Mishima¹ and T Sato²

¹ Second Department of Surgery, Faculty of Medicine, Tokyo Medical and Dental University, 1-5-45 Yushima, Bunkyo-ku, Tokyo, Japan
² Second Department of Anatomy, Faculty of Medicine, Tokyo Medical and Dental University, 1-5-45 Yushima, Bunkyo-ku, Tokyo, Japan

Summary. Based upon the detailed dissections of the lymphatic system of four adult cadavers, the lymphatic drainage of the gallbladder was divided into three pathways. 1) The cholecysto-retropancreatic pathway, which can be regarded as the main pathway, had two routes, one running spirally and posteriorly from the anterior surface of the common bile duct to the right, and the other running almost straight down from the posterior surface of the common bile duct. At the retroportal segment, these routes converged at a large lymph node, which appeared critical as the main terminal lymph node of this pathway. We designated this node the principal retroportal node. 2) The cholecysto-celiac pathway was the route by which some of the lymphatics from the gallbladder ran to the left through the hepatoduodenal ligament to reach the celiac nodes. 3) The cholecysto-mesenteric pathway was the route by which some of the lymphatics ran to the left in front of the portal vein and connected with the nodes at the superior mesenteric root. These three pathways converged with the abdomino-aortic lymph nodes near the left renal vein; in particular, the nodes in the interaortico-caval space were considered important.

Une étude anatomique du drainage lymphatique de la vésicule biliaire

Résumé. A partir de la dissection fine des lymphatiques de la vésicule biliaire effectuée sur 4 sujets adultes, trois voies de drainages ont pu être schématisées. 1) La voie cholécysto-rétro pancréatique qui peut être considérée comme la principale, comporte deux trajets, l’un descendant en spirale de la face antérieure de la voie biliaire principale vers son bord postéro-droit, et l’autre descendant directement à la face postérieure du conduit biliaire. Dans leur segment rétroportal, ces voies convergent vers un nœud lymphatique qui apparaît comme le principal nœud terminal de cette voie. Nous l’avons dénommé le nœud principal rétroportal. 2) La voie cholécysto-cœliaque est utilisée par quelques lymphatiques de la vésicule biliaire qui se dirigent vers la gauche à travers le ligament hépato-duodénal pour rejoindre les nœuds cœliaques. 3) La voie cholécysto-mésentérique est empruntée par des lymphatiques qui descendent vers la gauche en avant de la veine porte et rejoignant les nœuds situés à l’origine de l’artère mésentérique supérieure. Ces trois voies convergent vers les nœuds lymphatiques abdomino-aortiques situés à proximité de la veine rénale gauche; les nœuds situés dans l’espace inter-aortico-cave seront particulièrement importants.

Key words: Gallbladder — Lymphatic system — Carcinoma — Macroscopic anatomy

Abbreviations: Car, cardia; Ch, bile duct; Dia, diaphragm; Dr, thoracic duct; duo, duodenum; eso, esophagus; gry, celiac ganglion; grs, suprarenal gland; he, liver; l, lumbar vertebrae; pan, pancreas; py, pylorus; th, thoracic vertebrae; tz, suspensory ligament (Lig of Treitz); vf, gall bladder; ao, abdominal aorta; acm, middle colic a.; al, splenic a.; als, superior mesenteric a.; ard, right renal a.; ars, left renal artery; at, testicular a.; agd, right gastric a.; agdu, gastroduodenal a.; aged, right gastroepiploic a.; ags, left gastroepiploic a.; ahe, common hepatic a.; ahp, hepatic artery proper; apdp, posterior inferior pancreaticoduodenal a.; apdsc, posterior superior pan-
In recent years, various methods of extended radical operations have been performed for digestive cancers. For carcinoma of the gallbladder, large scale lymph node removal combined with partial resection of the liver is the standard procedure [8, 16]. Moreover, pancreaticoduodenectomy is sometimes recommended for advanced cases in order to completely remove the lymph nodes along the superior mesenteric root [8].

Regarding the lymphatic drainage of the gallbladder, excellent studies have been reported by Clermont and others from the end of 19th century [1, 3, 6, 20, 23]. However, these studies were performed by a dye injection method using fetuses, therefore, precise record and analyses of the adult lymphatic system are incomplete.

We analyzed the lymphatic drainage of the gallbladder based on detailed dissections of four adult cadavers. Our purpose was to elucidate the lymphatic pathways extending from the gallbladder to the thoracic duct, as well as their relations to the neighboring organs, blood vessels and autonomic nerves, and to provide basic information for more complete treatment of gallbladder cancer.

Materials and methods

Four adult cadavers (three males and one female) were used. According to the macroscopic dissection procedure developed by Deki, Sato and Sato [4, 25], dissection of the lymphatics from the gallbladder to the abdomino-aortic nodes was performed by sequential removal of the related organs.

In a separate related study, the interconnections of the lymph nodes of the area surrounding the gallbladder, the hepatoduodenal liga-ment and the posterior surface of the head of the pancreas were examined in 46 additional adult cadavers to confirm the findings of the present study.

Results

Specimen 1, No. 1657, male (Figs. 1-4)

Many lymphatics were found at the left half of the gallbladder and dense lymphatic networks were formed at the neck, but the cystic node was missing. At Calot's triangle, the lymphatic from the gallbladder ran along the cystic a. and v. and anastomosed with the lymphatics from the liver (Figs. 1, 2 and 4).

From the anterior surface of the gallbladder, the collecting lymphatics reached the right margin of the common bile duct, anastomosed with the lymphatics from the porta hepatis, descended spirally to the right rear margin, and terminated at node B. This node was located to the right of the common bile duct in the angle between the first and second portions of the duodenum. Almost all lymphatics from the inferior and posterior surfaces of the gallbladder drained directly to node B. However, some lymphatics reached node B via node C which was located in the front center of the foramen of Winslow (Figs. 1 and 2). The above-mentioned lymphatic route is designated here as the right lymphatic group of the ligament. These lymphatics were connected to the anterior lymphatic group of the ligament which descended from the porta hepatis along the anterior surface of the left half of the hepatoduodenal...