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Accompanying role of hepato-biliary-pancreas surgeon in urological surgery

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ABSTRACT

INTRODUCTION: The present case reports demonstrated the accompanying surgical support from hepato-biliary-pancreas (HBP) surgeons for urological surgery to secure operative safety because HBP surgeons are well experienced in dissecting techniques for mobilization of the liver or pancreas. We experienced 9 consecutive patients who underwent nephrectomy, adrenectomy or resection of retroperitoneal tumors by urological surgeons. Cardiovascular intervention was also required in cases of long tumor thrombus into the vena cava.
CASES: All patients had no severe co-existing diseases except the main tumor. Reverse T-shape incision was performed in 7 cases and thoracolaparotomy in two. Dissection and mobilization at the site of severe compression by the urinary tumors were performed in three cases. Partial liver resection was performed for testicular liver metastases in two, and right hepatectomy for right renal cancer was performed in one. Encircling the vena cava and preparation of transection for tumor thrombi were performed in three, and among these, cardiovascular intervention was necessary in two because of extension into the right atrium. During admission, all patient outcomes were uneventful without severe complications. We herein showed the representative two cases of combined surgery.
DISCUSSION: and conclusion The point of this case report is the coordination between each surgeon and anesthesiologist under precise perioperative planning or management. The role of HBP surgeons is to provide information as a specialist on the operative field for urological or cardiovascular surgery to achieve operative safety.

1. Introduction

In the field of hepato-biliary-pancreas (HBP) surgery, the surrounding organs are the kidneys, adrenal glands, retroperitoneal tissues and main abdominal vessels. The border between HBP surgery and urological surgery is close, but the respective surgeons usually do not treat beyond this border. In cases where the urinary tumor has progressed or metastasized to the adjacent organs, such as the liver, pancreas or vena cava [1,2], HBP surgeons often support in joint surgery [3]. Eleven co-author surgeons contributed patient managements and intraoperative supports. Two contributed cardiovascular interventions and three contributed the main perioperative managements and the main urological operations. Three chairmans and directors of each department performed the main operators in all operations, which were precisely described in Author's contribution section. The work has been reported in line with the SCARE criteria and cite [4]. The PROCESS Statement: Preferred Reporting of Case Series in Surgery. International Journal of Surgery 2016 by Agha RA, Fowler AJ, Rammohan S, Barai I, Orgill DP and the PROCESS Group.

2. Patients and procedures

A total of 9 consecutive patients undergoing urological surgery accompanied by HBP surgeons at the Department of Surgery and Urology at our institute between April 2015 and March 2017 were retrieved from the institute database. Informed consent for data collection was obtained from each patient during this period. Anes-

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thetic and patient data were also retrieved from the same database. No financial support was received for this study and the authors have no conflicts of interest to disclose.

The HBP surgeons and urological surgeons usually discuss the operative schedule or access point at 1-2 weeks before surgery. The operations and perioperative managements of operations in the present all cases were undergone at the Miyazaki University Hospital. In most cases, urological laparoscopic surgery is selected and the HBP surgeon performs the laparotomy after completion of vascular control and dissection of surrounding target organs. Main surgeries have been performed by 3 chairmans at the department of urological and HBP surgery. In case the estimated liver resection volume was higher than the permitted resection volume based on the liver functional reserve, the radiological intervention as portal vein embolization is usually scheduled. ICU managements was planned before surgery, if necessary. The HBP surgeon performs the reverse T-shape laparotomy for both left and right-side urological organs. In case the tumors originated from the right kidney or adrenal gland infiltrated into the retrohepatic vena cava or the right cardiac atrium, right oblique thoracolaparotomy through the 7th or 8th intracostal space is performed to obtain an operative field including the entire vena cava for operative safety. We examined preoperative clinical parameters, operative procedures, surgical records, and postoperative morbidity and mortality in these 9 patients.

3. Cases

Among the 9 present cases, all patients had the advanced stage 4 of urological malignancies. Two had co-morbidities of hypertension and alcohol or smoking habitations in three. The all patients showed the good general conditions as performance status score 0. The right nephrectomy with tumor thrombectomy in the vena cava was performed in three, left nephrectomy with tumor thrombectomy in one, right nephrectomy with replacement of the vena cava in one, and nephrectomy, adrenectomy, resection of testicular tumor and resection of retroperitoneum were performed only in six cases. The mean patient age was 45.4 years old, and there were 6 males and 3 females. All patients had no severe co-existing diseases except the main tumor. Reverse T-shape incision was performed in 7 cases and thoracolaparotomy in two. The HBP surgeons performed dissection and mobilization at the site of severe compression by the urinary tumors in three cases. Partial liver resection was performed for testicular liver metastases in two, and right hepatectomy for right renal cancer was performed in one. Encircling the vena cava and preparation of transection for tumor thrombi were performed in three, and among these, cardiovascular intervention was necessary in two cases with long adhesive tumor thrombi into the vena cava and tumor thrombi extending into the right atrium. All patient outcomes were uneventful without severe complications.

3.1. Case presentation

3.1.1. Case 1

A 55-year-old woman presented with invasive right renal cancer with regional lymph node metastases and tumor thrombi in the vena cava. The renal tumor compressed the right liver, but there was no remarkable invasion. The patient had well-reserved liver function. Examination of abdominal images revealed a 7-cm invasive right renal cell carcinoma and tumor thrombus spreading deeply inside the vena cava (Fig. 1a, b). She underwent neoadjuvant chemotherapy with Axitinib for 3 months and surgical resection was scheduled after reduction of the tumor. The HBP surgeon selected incisional access by right oblique thoracolaparotomy to expose the right side of the vena cava infiltrated by tumor thrombi for thrombectomy, and dissected between the liver and kidney (Fig. 1c). The HBP surgeon examined the tumor extension by intraoperative ultrasonography and encircled the vena cava at the cranial tip of the thrombi using vascular tape. Then, right nephrectomy and vena cava resection, including tumor thrombi, were safely performed by urological surgeons. Operating time was 4 h 43 min and blood loss was 400 ml. She was discharged uneventfully without any thoracic complications. She survived for 18 months although the tumor relapse within a year.

Case 1 exhibited invasive renal cell carcinoma (a; arrow) with tumor thrombus filling the inferior vena cava (b; arrow). The thoracoabdominal (the 7th intracostal) oblique incision with the lower median laparotomy incision is shown at the left lateral position (c).

3.1.2. Case 2

A 24-year-old man had undergone resection of left testicular tumor (mixed germ-cell tumor); however, the tumor relapsed as a 15 cm retroperitoneal node metastasis around the left kidney with widely infiltrated tumor thrombi into the right atrium via the left renal vein and vena cava (Fig. 2a). This patient underwent left nephrectomy and adrenectomy, including the retroperitoneal tumor, via laparoscopic approach by urological surgeons. After removal, upper median incision was performed and the HBP surgeon encircled the vena cava by the right side approach with mobilization of the pancreato-duodenum. After transection of the left renal vein by vascular staples, the tumor thrombi was removed by cardiovascular intervention. After rewarming, the patient immediately recovered without complications. Operating time was 12 h 7 min and blood loss was 4300 ml. At 8 months after the operation, remnant liver metastases in segments 2 and 7 were partially resected using the laparoscopic approach by HBP surgeons (Fig. 2b, c).

Case 2 exhibited metastatic mixed germ-cell tumor in the retroperitoneum (a) with tumor thrombus extending into the right atrium (b) (black arrow) via the left renal vein (white arrow). After successful tumor resection, two metastatic lesions in segments 2 (b) and 7 (c) of the liver were laparoscopically resected at a different time.

4. Discussion

In the field of hepato-biliary-pancreas surgery, mobilization of the liver or pancreas is usually necessary for major hepatectomy or pancreatectomy [5]. At that time, dissection or combined resection of the adrenal glands is often required. To our knowledge, there are no definite reports regarding the combination or joint surgery of HBP and urological surgeons, although both surgeons may sometimes support each other's surgeries. In the present series, urological surgeons were required to support the dissection between expansive tumor growth of the right kidney or adrenal gland, and encircle the tip of the tumor thrombi from the renal cell carcinoma with tape. The urologist performs vascular control of the renal hilum and dissection of the retroperitoneal tissues by laparoscopic procedures even for advanced stage tumors. However, it may be difficult to dissect the liver, pancreas and duodenum while avoiding intraoperative organ injuries. HBP surgeons are familiar with how to access to mobilize or to gain vascular control of the vena cava around this area [6]. In the present series, in cases where large HCCs compressed the right liver from the back to ventral side, injury of the liver capsule could not be avoided and definite hemostasis was necessary by suturing or sealing with adhesive hemostatic substances such as the fibrin sealant patch TachoShil® (CSL Behring, Parkville, Victoria, Australia) [7]. In cases where the tumor invaded into the liver parenchyma, adequate liver transection was necessary after considering chemotherapy-induced liver functional injury. Another point is that tumor infiltration or direct

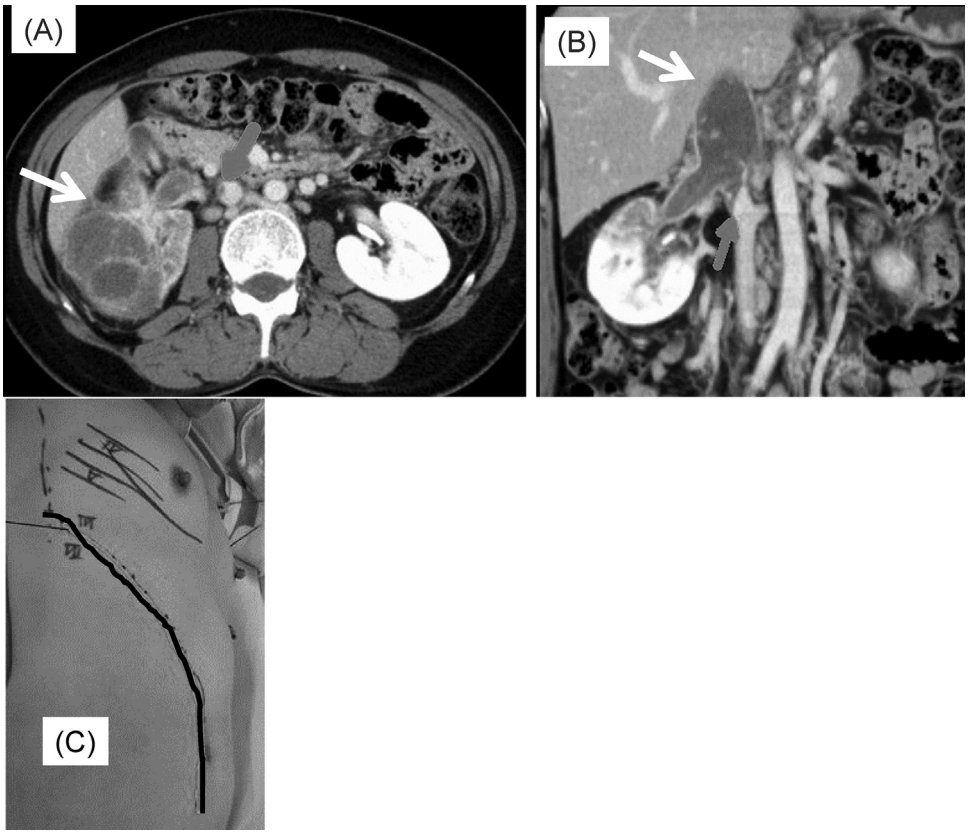

Fig. 1. Images and intraoperative position in Case 1.

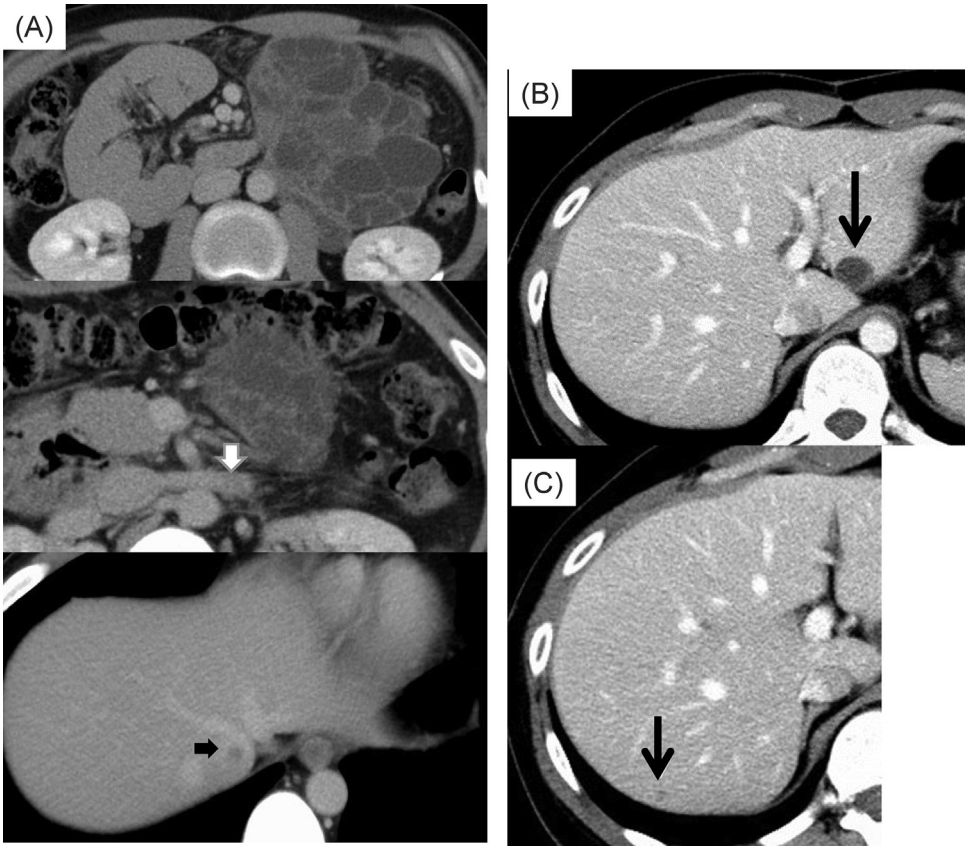

Fig. 2. Images in Case 2.

invasion to the vena cava originated from the kidney and adrenal gland [8]. Intravenous tumor thrombi often deeply extend into the vena cava or right atrium, and thrombectomy by cutting the vessels is required [9]. For vascular intervention, cardiovascular or HBP surgeons can support this with their expert techniques. To expose the entire vena cava, a good operative view, particularly on the cranial side, is necessary for operative safety. For HBP surgeons, the thoraco-abdominal approach to the vena cava has been traditionally performed since Jacob's right hepatectomy in 1952 [10]. From our experience, the thoracoabdominal incisional approach has been performed successfully and its usefulness was already demonstrated [11]. To achieve thrombectomy, transient clamping of the vena cava is necessary and the right thoracoabdominal approach is adequate in cases where the tumor extends adjacent to the hepatic veins. In cases where the tumor extends into the atrium, cardiovascular procedures are necessary. In this series, hypothermic circulating arrest was applied for removal of adhesive thrombi from the vena cava wall [12]. Postoperative hemorrhage was a concern, but serious complications were not observed.

The point of this case report is the coordination between each surgeon and anesthesiologist under precise perioperative planning or management. The role of HBP surgeons is to provide information as a specialist and create an operative field for urological or cardiovascular surgery to achieve operative safety. Furthermore, their expertise is necessary to prevent intraoperative injuries of the surrounding organs. HBP or general surgeons were sometimes required for immediate repairs of the intraoperative injuries, and therefore, a close relationship beyond each department was considered to be important [13].

5. Conclusion

We have demonstrated 10 recent cases of joint surgeries by HBP surgeons and urologists from the past two years. The present results demonstrated good postoperative outcomes following careful pre- and perioperative management and achievement of scheduled operations. More close relationship or collaboration between different surgeons would be necessary and the clinical study by the large number of consecutive patients is required to clarify the significances of these collaborations. A good relationship between both surgeons is necessary and the role of HBP surgeons was also important during usual practice.

Conflict of interest

The authors have no conflicts of interest to disclose.

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Ethical approval

At our institute, ethical permission for case report is not required under the nation policy.

Consent

Informed consent was obtained in all patients.

Author contributors

All authors contributed the perioperative management and writing this paper. Atsushi Nanashima is a main operator and wrote this mainly.

Guarantor

Professor Kunihide Nakamura and Toshiyuki Kamoto, who are a cardiovascular surgeon and a urological surgeon, who are both chairman of the Departments of Surgery and Urology, University of Miyazaki, Japan.

Submission declaration

The authors declare: that the work described has not been published previously, that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere including electronically in the same form, in English or in any other language, without the written consent of the copyright holder.

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