Editorial

The appropriate Pringle maneuver procedure in laparoscopic and robotic hepatectomies

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The Pringle maneuver is well recognized as an effective procedure to control not only massive bleeding of the liver, but also for uncomfortable continuous bleeding during a liver transection (1), and this maneuver can thus contribute to the accurate identification of the cutting plane of the liver. A concern regarding the Pringle maneuver is ischemic damage to the liver, and we have demonstrated that the Pringle maneuver can also be applied for living donor hepatectomy with preservation of the function of a partial liver graft, even after reperfusion in the recipient (1).

The Pringle maneuver was originally introduced in open surgery for severe liver trauma (2), and many reports have shown its efficacy in laparoscopic and robotic hepatectomies as well. Unlike its use in open surgery, there are two different approaches for the Pringle maneuver in laparoscopic and robotic hepatectomies, i.e., as an intracorporeal (3) or extracorporeal (4-6) procedure. Lim *et al.* compared the extracorporeal and intracorporeal approaches of the Pringle maneuver and provided the details of the extracorporeal Pringle approach (7). They identified no significant differences in surgical results or postoperative complications between the extracorporeal and intracorporeal approaches, but they concluded that the extracorporeal approach is superior to the intracorporeal approach because it is easy, reproducible, quickly usable, effective, and safe and can be applied independently by an assistant surgeon during a laparoscopic or robotic liver resection. Additionally, the extracorporeal Pringle maneuver is easily applied by liver surgeons who are familiar with the ordinary open hepatectomy (7).

We completely agree with the statement by Lim *et al.*, and we have applied the extracorporeal Pringle maneuver in our laparoscopic hepatectomy series. As Lim *et al.* noted, there are several options for the location of the trocar: the right flank (5,7,8), epigastrium (4), mid- or upper abdomen (6), and the left upper abdominal flank (9). In principle, our procedure is the same as that described by Lim *et al.*, but we developed several minor modifications of their procedure. Lim *et al.* showed that possible disadvantages of the extracorporeal approach gare the requirement of an additional port [with the creation of a small (1 cm) additional scar], and the risk of gas leakage.

To overcome these minor problems, we prefer to insert the tourniquet and trocar in the same scar. After placing the tape and tourniquet in the same manner as that described by Lim *et al.*, we remove the trocar and reinsert it just along the tourniquet from the same scar. No extension of the scar is required, because we use a soft rubber tourniquet that is generally applied as a urinary catheter. With this procedure, we can place the tourniquet at any port where it was already placed without requiring an additional port. In regard to encircling the hepatoduodenal ligament, we use the Endo Mini-Retract™ laparoscopic retractor (Covidien Healthcare, Mansfield, MA) so that we can access the hepatoduodenal ligament from any angle, which eliminates the need for an additional port at the far right or left side in cases in which a grasper is used to encircle the hepatoduodenal ligament. We propose that with these modifications, even the minor disadvantages of the extracorporeal Pringle maneuver compared to the

intracorporeal approach can be overcome, as shown by Lim *et al.*

As Lim *et al.* also mentioned, although a randomized prospective study dis necessary to elucidate the precise efficacy and feasibility of the extracorporeal approach for the Pringle maneuver, we recommend this technique as an easy and effective procedure to control bleeding during a laparoscopic or robotic hepatectomy.

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References

1. Takatsuki M, Soyama A, Hidaka M, et al. Prospective study of the safety and efficacy of intermittent inflow occlusion (Pringle maneuver) in living donor left hepatectomy. Hepatol Res 2015;45:856-62.
2. Pringle JH. V. Notes on the Arrest of Hepatic Hemorrhage Due to Trauma. Ann Surg 1908;48:541-9.
3. Cherqui D, Husson E, Hammoud R, et al. Laparoscopic liver resections: a feasibility study in 30 patients. Ann Surg 2000;232:753-62.
4. Patriti A, Ceccarelli G, Bartoli A, et al. Extracorporeal Pringle maneuver in robot-assisted liver surgery. Surg Laparosc Endosc Percutan Tech 2011;21:e242-4.
5. Rotellar F, Pardo F, Bueno A, et al. Extracorporeal tourniquet method for intermittent hepatic pedicle clamping during laparoscopic liver surgery: an easy, cheap, and effective technique. Langenbecks Arch Surg 2012;397:481-5.
6. Okuda Y, Honda G, Kurata M, et al. Useful and convenient procedure for intermittent vascular occlusion in laparoscopic hepatectomy. Asian J Endosc Surg 2013;6:100-3.
7. Lim C, Osseis M, Lahat E, et al. Extracorporeal Pringle Maneuver During Laparoscopic and Robotic Hepatectomy: Detailed Technique and First Comparison with Intracorporeal Maneuver. J Am Coll Surg 2018;226:e19-e25.
8. Piardi T, Lhuaire M, Memeo R, et al. Laparoscopic Pringle maneuver: how we do it? Hepatobiliary Surg Nutr 2016;5:345-9.
9. Inoue Y, Suzuki Y, Fujii K, et al. Laparoscopic Hepatic Resection Using Extracorporeal Pringle Maneuver. J Laparoendosc Adv Surg Tech A 2018;28:452-8.