



## Unification Venoplasty to Cope With Recipient Portal Vein Anomaly During Living Donor Liver Transplantation

S.-H. Kang, S. Hwang, D.-H. Jung, C.-S. Ahn, D.-B. Moon, T.-Y. Ha, G.-W. Song, K.-H. Kim, G.-C. Park, J.-M. Namgoong, Y.-H. Park, H.-W. Park, B.-H. Jung, and S.-G. Lee

---

### ABSTRACT

**Purpose.** To cope with recipient portal vein (PV) anomalies, such as early branching of the right posterior section (RPS), during living donor liver transplantation (LDLT) surgery, we performed a simulation study to standardize the surgical technique for unification portal venoplasty.

**Methods.** This study included an observational analysis of conventional methods utilizing RPS PV, simulation-based design of a new surgical technique, and clinical application of this new technique.

**Results.** In a case encountering RPS PV, a mild anastomotic PV stenosis was persistent over 6 months postsurgery, indicating the need for technical refinement. After computational simulation analysis, we found that simple suturing of the PV branch patch automatically resulted in a funnel-shaped elongation. A prospective recipient study ( $n = 30$ ) indicated that usual PV reconstruction via the PV bifurcation method is feasible in the absence of unusual donor or recipient PV anomaly. Retrospective living donor PV anatomy analysis ( $n = 20$ ) revealed that 20-mm-long limbs of the first-order PV branches are necessary to make a 10- to 15-mm-long funneled PV stump. This technique of unification venoplasty for an anomalous recipient PV was applied to an adult patient undergoing LDLT with a right liver graft, for which it was shown to be technically feasible and effective.

**Conclusions.** A simplified unification venoplasty technique was developed to cope with a recipient PV anomaly in adult LDLT.

---

A VARIETY of anatomical variations have been observed in the portal vein (PV) of donor and recipient organs during living donor liver transplantation (LDLT). When LDLT is performed, anomalous PV branching of a donor right liver usually requires unique techniques to overcome anatomical variations.<sup>1-3</sup> In contrast to the considerations on graft preparation, anomalies of the recipient PV have received little attention, largely because most adult recipient PVs have been amenable to end-to-end anastomosis, with the exception of cases of severe PV thrombosis. In fact, the diameter of the recipient PV, rather than the length, has historically been the main methodological concern.

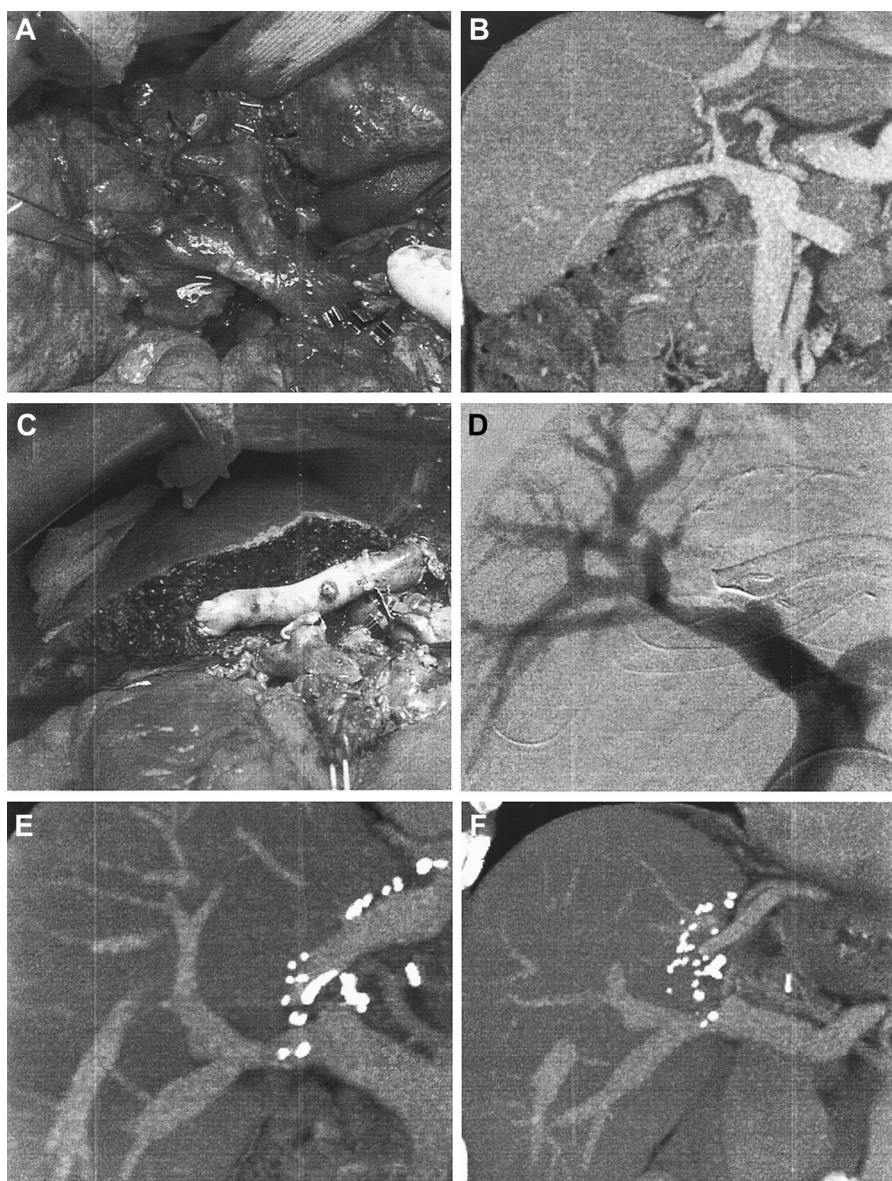
However, in rare cases, the length of the recipient main PV can appear too short to perform a secure portal anastomosis. For example, different reconstruction methods may be needed when an unusual anatomical variation of the PV,

such as early branching of the right posterior section (RPS), is combined with a relatively small graft in a patient with a deep right subphrenic fossa. While direct anastomosis to the RPS PV stump represents a possible surgical option, it can result in PV stenosis and inappropriate PV alignment, because the vein branch is a hepatic section PV, not a hemiliver PV. To cope with a recipient PV anomaly during

---

From the Division of Hepatobiliary Surgery and Liver Transplantation, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea.

Address reprint requests to Shin Hwang, MD, PhD, Division of Hepatobiliary Surgery and Liver Transplantation, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, 388-1 Poongnap-dong, Songpa-gu, Seoul, 138-736, Korea. E-mail: [shwang@amc.seoul.kr](mailto:shwang@amc.seoul.kr)



**Fig 1.** Portal vein (PV) reconstruction with the right posterior section (RPS) branch and post-transplant follow-up of PV anastomosis. Early RPS PV branching was identified during pre- and intraoperative evaluation (**A** and **B**). A right lobe graft with a graft-recipient weight ratio of 0.87 was implanted using the RPS PV branch (**C**). Because the recipient's RPS PV stump was rather short for direct PV anastomosis, the distal end of the RPS PV branch was used to relieve anastomotic tension. Gauze padding beneath the liver graft is visible. Graft middle hepatic vein was reconstructed with an iliac vein allograft. An intraoperative direct portography showed mild stenosis at the PV anastomosis (**D**). Mild PV stenosis persisted on follow-up computed tomography images taken 2 weeks (**E**) and 6 months (**F**) posttransplantation.

LDLT surgery, we performed a simulation study to develop a standard surgical technique for portal unification venoplasty. This surgical technique was then applied to an adult patient with a PV anomaly.

#### PATIENTS AND METHODS

This study focused on PV anomalies in adult patients who rendered organs unsuitable for direct reconstruction of a right liver graft using the recipient's main PV stump. Three parts comprised the study: an observational analysis of the conventional method using the RPS PV stump, a simulation-based design of a new surgical technique for cases involving such an anomaly, and clinical application of the newly designed technique.

First, a typical case was selected to follow the long-term sequela of PV reconstruction using the recipient RPS PV branch (**Fig 1**).

Second, we performed a simulation study to prepare a recipient-side main PV stump comparable to that in the case of a patient without a PV variation. This analysis using computational fluid dynamics software (ADINA fluid-structure interaction model, ADINA R&D, Inc, Mass, USA) led to a reconstruction experiment using actual bifurcating vessel materials.<sup>4</sup> Two types of unification venoplasty were initially devised: a straight elongation of the main PV after simple unification of the RPS PV branch and the other remaining distal PV portion (type A), and distal funneling of the main PV after funneled unification of the RPS PV branch and the other remaining distal PV portion with additional attachment of a vein patch (type B). These recipient PV stumps were virtually anastomosed to the usual-sized PV stump of right

Download English Version:

<https://daneshyari.com/en/article/6249944>

Download Persian Version:

<https://daneshyari.com/article/6249944>

[Daneshyari.com](https://daneshyari.com)