

Hepato-atrial anastomosis, the “other Senning operation” for treatment of Budd-Chiari syndrome

Dominique Delay, Christelle Lardi, Andres Jaussi, Ludwig K. von Segesser

Department of cardiac surgery, University Hospital Centre of Canton Vaux (CHUV), Lausanne, Switzerland

Summary

A now 36-year-old woman developed a suprahepatic inferior vena cava stenosis, 9 years after liver transplantation for extensive liver echinococcosis. The lesion was treated by percutaneous angioplasty and stenting. Five years later, recurrence of echinococcosis with intrastent stenosis together

with clinical symptoms, prompted surgical treatment. Hepato-atrial anastomosis was performed under cardiopulmonary bypass with good result.

Key words: hepato-atrial anastomosis; Budd-Chiari; inferior vena cava; stenting; echinococcosis

Introduction

The management of hepatic venous outflow obstruction is a complex problem due to the diverse pathologies involved. Medical therapy remains limited, and the obstruction often recurs

after percutaneous endovascular procedures. Localization and anatomy of the confluence between the hepatic veins and the inferior vena cava render surgical approach difficult.

Clinical problem

A now 36-year-old woman underwent liver transplantation in 1990 for extensive unresectable liver alveolar echinococcosis. The evolution was fine and marked by a successful pregnancy. However, in 1999 she developed a symptomatic supra-

hepatic inferior vena cava stenosis consecutive to local echinococcosis recurrence. The stenosis was treated by percutaneous angioplasty and stenting with good clinical result. In 2004, the reappearance of symptoms of exercise dyspnoea, legs swelling and two episodes of syncope urged a complete work-up. An intrastent restenosis was found causing a 10 mm Hg pressure gradient between the inferior vena cava and the right atrium. The cardiac output was measured at 3.26 l/min for a cardiac index of 1.9 l/min/m² proving the restrictive haemodynamic effect of the lesion and explaining the symptoms. After discussion with the patient and her treating physicians, a surgical approach was chosen which combined resection of the parasitic mass and hepato-atrial anastomosis. The operation was carried out through a median sternotomy with beating heart under cardiopulmonary bypass assistance with standard superior vena cava venous cannulation, the open inferior vena cava being cannulated from the groin with a Smart canula [1]. The entire suprahepatic inferior vena cava was resected together with the stent and as much as possible of the parasitic mass cutting

Figure 1

Suprahepatic inferior vena cava intrastent restenosis.

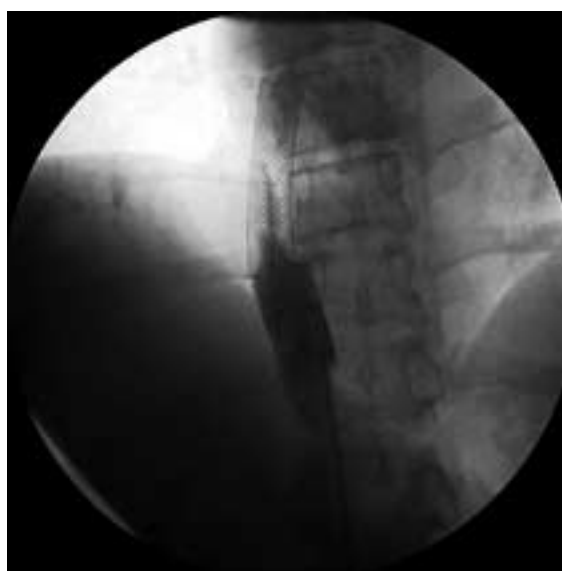


Figure 2

Resection specimen showing stent invasion.



through the diaphragm into liver parenchyma, setting free the orifices of major hepatic veins as reported by Senning [2]. The vascular continuity was then re-established by creating a tunnel between the diaphragmatic orifice and the right atrium using right atrial tissue for the posterior part and equine pericardium for the anterior and lateral parts. Equine pericardium had to be used since most of the inferior vena cava was resected with the lesion. Histopathology confirmed the diagnosis of recurrent echinococcosis with an important inflammatory and granulomatous reaction. The operation went well; the patient left the hospital on post-operative day 12 under lifelong albendazol treatment without any residual gradient measured by Doppler ultrasound. Three months after the operation, the patient was doing well and symptom free.

Discussion

Inoperable liver echinococcosis remains a rare indication for liver transplantation, with as little as 42 cases reported in Europe between 1985 and 2002. Recurrence of the disease in this subgroup is common and certainly favoured by the use of immunosuppressants [3].

Inferior vena cava obstruction following liver transplantation is an uncommon complication occurring in less than 2.5% of the cases, usually resulting from technical problems such as compression/torsion of the inferior vena cava [4].

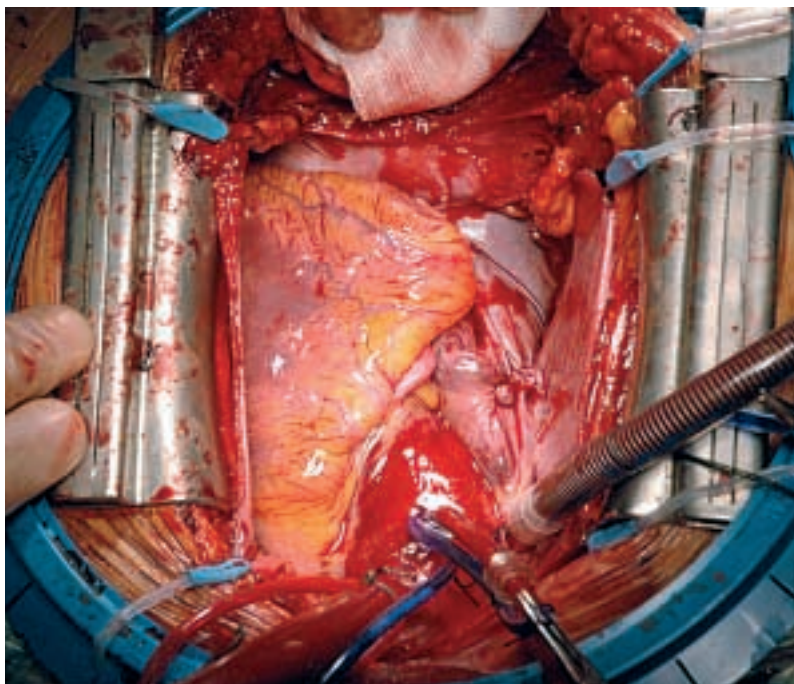
Percutaneous endovascular treatment of

Budd-Chiari syndrome has been described [5, 6]. However, recurrences with stent thrombosis are frequent, often with severe consequences [5], necessitating surgical interventions.

Different types of surgical therapies have been proposed to relieve portal hypertension such as mesoatrial or mesocaval shunts [7]. However, the only intervention able to correct the underlying problem, ie obstruction of the major hepatic veins, is the operation first described by Åke Senning in 1983 under the name "Dorsocranial liver resection and direct hepato-atrial anastomosis" [1]. Its first

Figure 3

Operative view showing completed hepato-atrial anastomosis.



indication was the treatment of Budd-Chiari syndrome [8, 9] but it can also be used to address other suprahepatic vena cava pathologies, including trauma as has been reported in one case [10].

As liver transplantation has become the treatment of choice for advanced Budd-Chiari syndrome, hepato-atrial anastomosis fell into oblivion despite good reported long term results [11] without the complications of lifelong immunosuppressive therapy. However, irreversible liver parenchyma damage and obstruction of small sublobular and centrilobular veins, remain indications for liver transplantation.

Although the surgical "Senning" technique is not very well known, it deserves the attention of practicing surgeons. It probably is the best ap-

proach to address hepatic venous outflow obstructions and suprahepatic vena cava pathologies of diverse origins; it restores direct anatomic continuity, it can relieve obstruction of the major hepatic veins and it can often be completed without the use of any foreign material.

Correspondence:

D. Delay

Department of cardiac surgery

CHUV

Bugnon 46,

CH-1011 Lausanne

E-Mail: ddelay@botmail.com

References

- 1 Corno AF, Horisberger J, David J, von Segesser LK. Right atrial surgery with unsnared inferior vena cava. *Eur J Cardiothorac Surg* 2004;26:219-20.
- 2 Senning A. Transcaval posterocranial resection of the liver as treatment of the Budd-Chiari syndrome. *World J Surg* 1983;7:632-40.
- 3 Bresson Hadni S, Koch S, Miguet JP, Gillet M, Mantion GA, Heyd B, Vuitton DA. European group of clinicians. Indications and results of liver transplantation for Echinococcus alveolar infection: an overview. *Langenbecks Arch Surg* 2003;388:231-8. Epub 2003 Aug 05.
- 4 Brouwers MA, de Jong KP, Peeters PM, Bijleveld CM, Klomp-maker JJ, Sloof M. Inferior vena cava obstruction after orthotopic liver transplantation. *Clin Transplant* 1994;8:19-22.
- 5 Pelage JP, Denys A, Valla D, Sibert A, Sauvanet A, Belghiti J, Menu Y. Budd Chiari syndrome due to prothrombotic disorder: mid-term patency and efficacy of endovascular stents. *Eur Radiol* 2003;13:286-93.
- 6 Griffith JF, Mahmoud AE, Cooper S, Elias E, West RJ, Olliff SP. Radiological intervention in Budd-Chiari syndrome: technique and outcome in 18 patients. *Clin Radiol* 1996;51:747-8.
- 7 Slakey DP, Klein AS, Venbrux AC, Cameron JL. Budd-Chiari syndrome: current management options. *Ann Surg* 2001;233:522-7.
- 8 Banský G, Ernest C, Jenni R, Zollikofer C, Burger HR, Senning A. Treatment of Budd-Chiari syndrome by dorsocranial liver resection and direct hepatoatrial anastomosis. *J Hepatol* 1986;2:101-12.
- 9 Pasic M, Senning A, von Segesser L, Carrel T, Turina M. Transcaval liver resection with hepatoatrial anastomosis for treatment of patients with The Budd-Chiari syndrome. Late results. *J Thorac Cardiovasc Surg* 1993;106:275-82.
- 10 Zogno M, Danieli G, Pardini A, Fucci C, Ferrari M, Caradonna E, et al. Hepato-atrial anastomosis as emergency treatment for traumatic rupture of suprahepatic inferior vena cava and hepatic veins. *Eur J Cardiothorac Surg* 1990;4:675-7.
- 11 Vogt PR, Andersson LC, Jenni R, Risti B, von Segesser LK, Turina M. Dorsocranial liver resection and direct hepatoatrial anastomosis for hepatic venous outflow obstruction: long-term outcome and functional results. *Am J Gastroenterol* 1996;91:539-44.

The many reasons why you should choose SMW to publish your research

What Swiss Medical Weekly has to offer:

- SMW's impact factor has been steadily rising, to the current 1.537
- Open access to the publication via the Internet, therefore wide audience and impact
- Rapid listing in Medline
- LinkOut-button from PubMed with link to the full text website <http://www.smw.ch> (direct link from each SMW record in PubMed)
- No-nonsense submission – you submit a single copy of your manuscript by e-mail attachment
- Peer review based on a broad spectrum of international academic referees
- Assistance of our professional statistician for every article with statistical analyses
- Fast peer review, by e-mail exchange with the referees
- Prompt decisions based on weekly conferences of the Editorial Board
- Prompt notification on the status of your manuscript by e-mail
- Professional English copy editing
- No page charges and attractive colour offprints at no extra cost

Editorial Board

Prof. Jean-Michel Dayer, Geneva
 Prof. Peter Gehr, Berne
 Prof. André P. Perruchoud, Basel
 Prof. Andreas Schaffner, Zurich
 (Editor in chief)
 Prof. Werner Straub, Berne
 Prof. Ludwig von Segesser, Lausanne

International Advisory Committee

Prof. K. E. Juhani Airaksinen, Turku, Finland
 Prof. Anthony Bayes de Luna, Barcelona, Spain
 Prof. Hubert E. Blum, Freiburg, Germany
 Prof. Walter E. Haefeli, Heidelberg, Germany
 Prof. Nino Kuenzli, Los Angeles, USA
 Prof. René Lutter, Amsterdam, The Netherlands
 Prof. Claude Martin, Marseille, France
 Prof. Josef Patsch, Innsbruck, Austria
 Prof. Luigi Tavazzi, Pavia, Italy

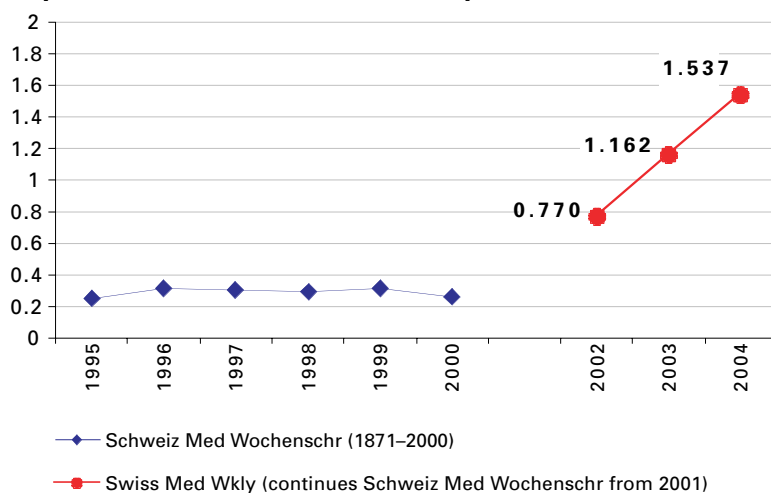
We evaluate manuscripts of broad clinical interest from all specialities, including experimental medicine and clinical investigation.

We look forward to receiving your paper!

Guidelines for authors:

http://www.smw.ch/set_authors.html

Impact factor Swiss Medical Weekly



All manuscripts should be sent in electronic form, to:

EMH Swiss Medical Publishers Ltd.
 SMW Editorial Secretariat
 Farnsburgerstrasse 8
 CH-4132 Muttenz

Manuscripts: submission@smw.ch
 Letters to the editor: letters@smw.ch
 Editorial Board: red@smw.ch
 Internet: <http://www.smw.ch>