

Case report : a 54-year-old patient with liver cirrhosis and refractory ascites treated with a new technology – the ALFApump® System

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Introduction

Ascites is a common complication in patients with liver cirrhosis, indicating portal hypertension and kidney dysfunction (1, 2). Ascites decreases quality of life and prompts spontaneous bacterial peritonitis. Medical treatment of ascites in liver cirrhosis begins with sodium restriction and the administration of diuretics. With progressive hepatic decompensation, ascites may become refractory, i.e. it cannot be adequately mobilized either due to nonresponse, complications following diuretic treatment or because the recurrence of ascites cannot be satisfactorily prevented by medical therapy (3). Repeated large-volume paracentesis combined with albumin infusion is one of the recommended treatment options (2) even though large-volume paracentesis is associated with circulatory dysfunction (4). Recent data suggest that recurrent ascites is better prevented by a transjugular intrahepatic portosystemic shunt (TIPS) (5). A transjugular intrahepatic portosystemic shunt (TIPS) has been extensively used in the treatment of refractory ascites due to portal hypertension. One of the most difficult steps in this procedure is catheterization of the ideal hepatic vein and hepatic-to-portal vein puncture, e.g. due to abnormal anatomical relation between portal and hepatic vein in a small cirrhotic liver. Several contraindications for a TIPS placement exist, such as chronic hepatic encephalopathy or organized complete thrombosis of the portal vein, while use of peritoneovenous shunting is limited by a rather high complications incidence induced by the procedure. In addition, approximately 40 % of patients develop an obstruction of the peritoneovenous prosthesis within the first postoperative year.

We report on our experience with a new implantable device in the treatment of refractory ascites, in a patient who developed refractory ascites due to alcoholic liver cirrhosis and received an ALFApump™ (Automated Low-Flow Ascites Pump) System – a subcutaneously implanted battery-powered device that transports ascitic fluid into the bladder so the patient can eliminate it through normal urination (Sequana Medical – Zurich, Switzerland).

Case report

A 54-year-old woman with liver cirrhosis due to alcohol abuse, diagnosed four years ago, was admitted to the hospital due to massive ascites caused by decompensated alcoholic liver cirrhosis and slightly elevated renal parameters and hyponatremia. There were no co-morbidities unrelated to liver cirrhosis. The liver cirrhosis was in a decompensated condition (Child C, MELD 23). Concomitant medications included proton pump inhibitor, vitamin K and magnesium. The patient had regularly abused alcohol over several years but had successfully stopped this abuse six months prior to admission.

Clinical examination revealed signs of liver cirrhosis and a substantial abdominal distention due to massive ascites. The pre-implantation laboratory findings are listed in Table 1. Natriuresis was very low (22 mmol/L). In this patient, medical diuretic treatment (maximum dosage of 120 mg/dL furosemide and 200 mg/dL spironolactone) of ascites became insufficient and had to be stopped. Diuretic resistance developed, as well as an associated slight renal impairment (creatinine 1.7 mg/dL) and hyponatremia (129 mmol/L). Repeated large-volume paracentesis had to be performed during the last three months, with an average amount of 5L twice monthly.

We decided to treat this patient by placing a transjugular intrahepatic portosystemic shunt (TIPS), which failed due to very small hepatic veins of the cirrhotic liver. After reviewing the inclusion and exclusion criteria and obtaining informed consent from the patient, she was included in Sequana Medical's PIONEER Study - a prospective, multi-center, open label, non-randomized study to investigate the safety and performance of the ALFApump System in patients with refractory ascites and diuretic resistance. The procedure was performed under general anesthesia with an open surgical technique and took about 45 minutes. The patient received antibiotic prophylaxis with ciprofloxacin (500 mg per day) during the perioperative period and experienced no signs of infection. There were also no implant – or device – related

complications noted in our patient. The post-implantation laboratory findings are listed in Table 1.

After implantation of the ALFApump System, the serum albumin remained stable, while serum creatinine and bilirubin decreased. The patient was discharged after seven days in a very stable condition and was transferred to the outpatient setting for follow-up. Paracentesis was no longer necessary during the patient's hospital stay.

The follow-up period has continued over 330 days post-implantation of the ALFApump and the patient's condition has been very stable throughout. She has felt very comfortable and paracentesis has no longer been necessary. With the ALFApump System, an average of 0.8 L of ascites is removed per day. More than 240 L of ascites have been removed in total during the follow-up period. Laboratory findings – 330 days after implantation – are listed in Table 1. The stage of cirrhosis improved to Child A and MELD 7.

During the follow-up period, we controlled the ascites fluid by ultrasound. Since implantation of the ALFApump, only a very small amount of ascites (not more than 0.5 - 1 L) has been detected and there is still no indication for diagnostic or therapeutic paracentesis. The patient continues to feel comfortable and has noted an improved quality of life. In particular, her appetite has increased and hence her body weight – but not due to ascites.

Summary

This case report shows that continuous paracentesis using the ALFApump System is indeed feasible in selected patients. Interestingly, the continuous loss of ascites is completely compensated in this situation and kidney function remains preserved.

References :

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TABLE 1 : LABORATORY FINDINGS PRE-IMPLANTATION AND DURING THE FOLLOW-UP TIME

Parameter	Pre-implantation	5 days post-implantation	330 days post-implantation
Hemoglobine (g/dL)	11.9	11.1	11.5
White blood count (G/l)	11	6	6.3
Platelet count (G/L)	211	214	181
AST (U/L)	38	43	21
ALT (U/L)	10	9	11
Alkaline phosphatase (U/L)	193	149	124
Gamma glutamyl transferase (U/L)	77	85	130
Total bilirubin (mg/dL)	4.1	1.6	0.56
Creatinine (mg/dL)	1.7	1.5	0.6
Urea (mg/dL)	28	44	30
INR	1.2	1.1	1.1
Serum albumin (g/dL)	28	29.6	39
Sodium (mmol/L)	129	131	142
Potassium (mmol/L)	4	5.5	4.6