

Case report: the thoracoscopic surgery in peritoneal-pleural leakage. A valid therapeutic strategy

Nefologo in Corsia

Giada Giovanna Olga Bigatti¹, Brunilda Khaferi², Elisa Nava¹, Lara Traversi¹, Daniele Ciurlino¹, Tiziana Mazzullo¹, Silvia Tedoldi¹, Stefania Martino¹, Margarita Nora Villa¹, Matteo Oriani³, Massimo Castiglioni⁴, Silvio Volmer Bertoli¹

1 Department of Nephrology, IRCCS Multimedica, Sesto San Giovanni, Milan, Italy

2 Department of Medicine and Surgery, University of Milan-Bicocca, Monza, Italy

3 Department of Radiology, IRCCS Multimedica, Sesto San Giovanni, Milan, Italy

4 Department of Thoracic Surgery, IRCCS Multimedica, Sesto San Giovanni, Milan, Italy

Corrispondenza a:

Dott. Silvio Volmer Bertoli

Department of Nephrology, IRCCS Multimedica

Via Milanese 300

20099 Sesto San Giovanni (MI), Italy

Tel: +390224209343

Fax: +390224209047

E-mail: silvio.bertoli@multimedica.it



Giada Giovanna Olga Bigatti

ABSTRACT

Pleuro-peritoneal leakage is an uncommon complication of peritoneal dialysis (PD). In this study, we report the case of a male patient (age 83), treated with PD (daytime single-exchange). In October 2019, hospitalization was necessary due to dyspnoea and a reduction of peritoneal ultrafiltration. A right pleural leakage resulted at chest x-ray. A regression of the pleural leakage was immediately observed after interrupting PD.

It was then performed a pleuro-peritoneal CT scan at baseline, followed by a second scan performed 4 hours after the injection of 2 L of isotonic solution with 100ml of contrast medium, which evidenced a pleuro-peritoneal communication. It was then decided to perform a video-assisted thoracoscopic surgery (VATS), that showed no evidence of diaphragm communication. It was then executed a pleurodesis using sterile talcum. The patient was released on the 3rd day, with a conservative therapy and a low-protein diet. After 2 weeks a new pleuro-peritoneal CT scan with contrast medium was executed. This time the scan evidenced the absence of contrast medium in the thoracic cavity. The patient then resumed PD therapy, with 3 daily exchanges with isotonic solution (volume 1.5 L), showing no complications. Concerning the treatment of pleuro-peritoneal leakage, VATS allows both the patch-repairing of diaphragmatic flaws and the instillation of chemical agents. In our case, VATS allowed the chemical pleurodesis which in turn enabled, in just 2 weeks of conservative treatment, the resuming of PD. In conclusion, this methodology is a valid option in the treatment of pleuro-peritoneal leakage in PD patients.

KEYWORDS: pleuro-peritoneal leakage, video-assisted thoracoscopic surgery, peritoneal dialysis, end stage renal disease

Introduction

Pleuro-peritoneal leakage is an uncommon complication of peritoneal dialysis (PD) with an incidence of 1.6%, first described in 1967 [1]. It occurs in higher frequency in female patients and in the right hemithorax (90% of cases) [2]. Frequently accompanied by dyspnea, it is asymptomatic in 25% of cases [3].

The diagnosis is established observing pleural leakage and performing chest x-ray, albumin-marked scintigraphy and CT scan of peritoneal area [4].

Case report

We report the case of a male patient (age 83), in single-exchange CAPD (Continuous Ambulatory Peritoneal Dialysis), that developed a right-handed massive pleural leakage.

He was affected by end stage renal disease in single kidney (previous nephrectomy due to renal neoplasia in 2017), atrial fibrillation, arterial hypertension and benign prostatic hyperplasia. On October 2018, after the insertion of Tenckhof peritoneal catheter, it was started incremental PD with daytime single-exchange (isotonic solution, 2000ml) in presence of residual renal function.

In October 2019, the patient was hospitalized due to dyspnea and reduction of peritoneal ultrafiltration. At chest X-ray a right pleural leakage was evidenced. In the assumption of a pleuro-peritoneal connection, CAPD was suspended and the patient was treated with furosemide iv, obtaining the complete resolution of the pleural leakage. The patient, informed about the risks of potential relapse resuming PD, rejected to shift to haemodialysis. He was released, with daytime single-exchange therapy alternating isotonic and hypertonic solution.

After a week, a new chest X-ray was performed, evidencing relapse of pleural leakage (Figure 1).



Fig. 1: Chest X-ray performed after restarting daytime single-exchange therapy, evidencing recidivism of pleural leakage

CAPD was again suspended and it was performed a pleuro-peritoneal CT scan. A basic CT scan excluded pleural leakage (Figure 2A). It was then injected an isotonic solution (2000ml) with 100ml of contrast medium (Gastrografin®). The second CT scan, performed after 4 hours, evidenced an hyperdense peritoneal leakage and a right pleural leakage, due to pleuro-peritoneal connection (Figure 2B). It was unlikely identifiable, due to small dimension, the diaphragm connection. Considering the concern of the patient to not shift to haemodialysis, it was decided to perform a video-assisted thoracoscopic surgery (VATS). After evaluation with echocardiography and spirometry test, and after written consensus from the patient, VATS was performed in general anesthesia. It was done an initial access from the 7th right inter-costal space, with the introduction of the optical device, evidencing a free pulmonary cavity. It was then performed an ulterior access from the 6th inter-costal space, followed by a detailed exploration of the pleural cavity, especially of the diaphragm's surface, not evidencing any connection with the abdomen. It was executed a pleurodesis using 8gr of sterile talcum covering diaphragm's surface. The surgical procedure lasted 10 minutes without complications. The patient was released the 3rd day, with a conservative therapy and low-protein diet.

After two weeks, a new pleuro-peritoneal CT scan was executed. After basic thorax scan, it was injected an isotonic solution (2000 ml) with 100 ml of contrast medium. Four hours later, the CT scan evidenced the absence of contrast medium in the thoracic cavity (Figure 2C).

The patient resumed CAPD (3 daily exchanges) with isotonic solution and reduced volume (1500ml) showing no complications.



Fig. 2: A) Chest TC of the patient showed not hydrothorax in the right thorax cavity; B: Chest TC of the patient after 4 hours. Gastrografin® was administered into the peritoneal cavity with dialysate and 4 hours later, a leakage of the dialysate into the right pleural cavity was detected (white arrow); C: Chest TC 2 weeks after the video-thoracoscopy procedure. There is no evidence of right hydrothorax or leakage after 4 hours of Gastrografin® administration into the peritoneal cavity

Discussion and conclusions

We presented a case of a right pleural effusion in pleuro-peritoneal leakage of diaphragmatic type. Hydrothorax is a complication related to PD, caused by a pleural-peritoneal fistula (congenital or acquired) which allows the passage in the pleural cavity of the peritoneal liquid. In 50% of PD patients it is necessary to shift to haemodialysis [3, 4]. The diagnosis of pleuro-peritoneal communication can be confirmed through glucose concentration in pleural liquid, injection of radio-isotopes in the pleural cavity, or CT scan/MRI of the pleuro-peritoneal area [5].

There are no clear guidelines concerning the treatment of the pleuro-peritoneal communication [6]. It can be of conservative type (reduction of the dialytic-exchange volumes and the temporary PD suspension) or surgical type. The procedure of pleurodesis leads the intra-pleural injection of agents like autologous blood, sterile talc or fibrine glue, through the drain tube. The conservative

approach is unsuccessful in 50% of the cases, while the surgical approach had higher success rate and can be offered as an option to the patients motivated to continue PD [4].

The mini-invasive surgery procedure using an optical device for the treatment of the pleuro-peritoneal fistula was first described in 1996 [7]. Since then, numerous surgical procedures had been reported, as the direct suture, the resection of the diaphragm's defect using mechanical stapler, mechanical pleurodesis and chemical pleurodesis using talc and similar agents; these techniques, used singularly or in combination, have demonstrated a success rate close to 90%, whenever the diaphragm defect is identified during the surgical exploration.

When no defect of the diaphragm is evidenced, it is advised to use the chemical pleurodesis technique with sterile talc [7], that has a reported success rate close to 70% [8]. The mass of talc adopted varies from 2.5g to 8g and is not correlated to the success of the procedure. Moreover, the procedure required a reduced surgical time (about 10 minutes), decreasing the overall effect of surgery and total anesthesia, especially in weak patients.

CAPD can be resumed from 1 to 7 weeks after the surgery [8, 9]. In our case the patient resumed PD (with reduced volumes) after just 2 weeks.

In conclusion, VATS with plural-injection of talc demonstrated its safety and efficiency in the treatment of pleuro-peritoneal leakage in a patient motivated in carrying on PD. Indeed, the conservative treatment is characterized by an elevated percentage of failure with permanent shift to haemodialysis [8], while VATS allows both the patch-reparation of the eventual diaphragm's defect and the chemical pleurodesis with the instillation of irritating agents in the pleural cavity through the drain line. In our experience, VATS permitted, after excluding macro diaphragm's defects, an efficient chemical pleurodesis, with mini-invasive approach, instilling talc in the whole pleural cavity, particularly at diaphragm's level. This allowed to resume PD with reduced-volume exchanges.

VATS is therefore a valid option in treating pleuro-peritoneal connection in PD patients motivated to continue PD.

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