nefrología
Revista de la Sociedad Española de Nefrología
www.revistanefrologia.com

Review

Intraperitoneal pressure in peritoneal dialysis☆

Vicente Pérez Díaz[a,b,*], *Sandra Sanz Ballesteros*[a], *Esther Hernández García*[c], *Elena Descalzo Casado*[d], *Irene Herguedas Callejo*[d], *Cristina Ferrer Perales*[a]

[a] *Servicio de Nefrología, Hospital Clínico Universitario de Valladolid, Valladolid, Spain*
[b] *Departamento de Medicina, Dermatología y Toxicología, Facultad de Medicina, Universidad de Valladolid, Valladolid, Spain*
[c] *Servicio de Nefrología, Complejo Asistencial Universitario de Palencia, Palencia, Spain*
[d] *Facultad de Medicina, Universidad de Valladolid, Valladolid, Spain*

ARTICLE INFO

Article history:
Received 29 June 2016
Accepted 22 May 2017
Available online 22 November 2017

Keywords:
Intraperitoneal pressure
Hydrostatic pressure
Ultrafiltration
Ultrafiltration failure
Mechanical complications of peritoneal dialysis
Infusion volume

ABSTRACT

The measure of intraperitoneal pressure in peritoneal dialysis is easy and provides clear therapeutic benefits. However it is measured only rarely in adult peritoneal dialysis units. This review aims to disseminate the usefulness of measuring intraperitoneal pressure. This measurement is performed in supine before initiating the drain of a manual exchange with "Y" system, by raising the drain bag and measuring from the mid-axillary line the height of the liquid column that rises from the patient. With typical values of 10–16 cm H_2O, intraperitoneal pressure should never exceed 18 cm H_2O. With basal values that depend on body mass index, it increases 1–3 cm H_2O/L of intraperitoneal volume, and varies with posture and physical activity. Its increase causes discomfort, sleep and breathing disturbances, and has been linked to the occurrence of leaks, hernias, hydrothorax, gastro-esophageal reflux and enteric peritonitis. Less known and valued is its ability to decrease the effectiveness of dialysis significantly counteracting ultrafiltration and decreasing solute clearance to a smaller degree. Because of its easy measurement and potential utility, should be monitored in case of ultrafiltration failure to rule out its eventual contribution in some patients. Although not yet mentioned in the clinical practice guidelines for PD, its clear benefits justify its inclusion among the periodic measurements to consider for prescribing and monitoring peritoneal dialysis.

DOI of original article:
http://dx.doi.org/10.1016/j.nefro.2017.05.014.

☆ Please cite this article as: Pérez Díaz V, Sanz Ballesteros S, Hernández García E, Descalzo Casado E, Herguedas Callejo I, Ferrer Perales C. La presión intraperitoneal en diálisis peritoneal. Nefrologia. 2017;37:579–586.

* *Corresponding author.*
E-mail address: vperez5651@gmail.com (V. Pérez Díaz).

La presión intraperitoneal en diálisis peritoneal

Palabras clave:
Presión intraperitoneal
Presión hidrostática
Ultrafiltración
Fallo de ultrafiltración
Problemas mecánicos en diálisis peritoneal
Volumen de infusión

RESUMEN

La medida de la presión intraperitoneal en diálisis peritoneal es muy sencilla y aporta claros beneficios terapéuticos. Sin embargo, su monitorización todavía no se ha generalizado en las unidades de diálisis peritoneal de adultos. Esta revisión pretende divulgar su conocimiento y la utilidad de su medida. Se realiza en decúbito antes de iniciar el drenaje de un intercambio manual con bolsa en Y, elevando la bolsa de drenaje y midiendo la altura que alcanza la columna de líquido desde la línea medio-axilar. Los valores habituales son 10 a 16 cmH_2O y nunca debe superar los 18 cmH_2O. Aumenta de 1 a 3 cmH_2O por litro de volumen intraperitoneal sobre valores basales que dependen del índice de masa corporal y varía con la postura y la actividad física. Su aumento provoca malestar, alteraciones del sueño y de la respiración, y se ha relacionado con la aparición de fugas de líquido, hernias, hidrotórax, reflujo gastroesofágico y peritonitis por gérmenes intestinales. Menos conocida y valorada es su capacidad para disminuir la eficacia de la diálisis contrarrestando, sobre todo, la ultrafiltración y, en menor grado, el aclaramiento de solutos. Por su facilidad de medida y potencial utilidad, debería ser uno de los factores que investigar en los fallos de ultrafiltración, pues su elevación podría contribuir a ellos en algunos pacientes. Aunque todavía no se menciona en las guías de actuación en diálisis peritoneal, sus claros beneficios justifican su inclusión entre las mediciones periódicas que considerar para la prescripción y seguimiento de la diálisis peritoneal.

Introduction

In pediatric peritoneal dialysis (PD) infusion volume is calculated using objective criteria taking into consideration the size or intraperitoneal pressure (IPP). In adults the guidelines do not provide specific recommendation and the prescription of infusion volume is usually based on size of the patient, weight and body surface, without taking into account the IPP. In any case, this volume infused increases the IPP which may cause discomfort, fullness, sleep disturbances, hemodynamic and respiratory alterations and it is believed that contribute to certain mechanical complications (leakage, hernia, etc.).[1,2] Is less known the effect of IPP on the efficacy of dialysis, mainly through a reduction of ultrafiltration (UF),[3–5] and this is the aspect that we like to discuss here in more detail. Since we are convinced of the advantages of its simple determination, we want to disseminate its knowledge and promote its routine use for a rational prescription of infusion volume in PD and in the management of UF disorders.

How is intraperitoneal pressure measured in peritoneal dialysis?

The IPP in PD is measured by noninvasive methods. The simplest and safest method was published by Durand in 1992[6,7] (Fig. 1); it measures the IPP in the filled abdomen before drainage. The patient should be supine on a horizontal position, relaxed and with the head supported so abdominal wall is relaxed to avoid pressure on the abdomen. A "Y" system PD bag is attached and the drainage bag is held in a raised support; a graduated ruler is placed next to the line going from the patient up to the bag and aligning level 0 with the mid axillary line. Then, the catheter connection is opened (in systems with wheel, stay-safe® type, it is aligned to the drainage position) and the column of liquid rises to a level where it stabilizes with a respiratory oscillation of 1–2 cm H_2O which guarantees a correct measurement. The IPP will be measured as the midpoint of that oscillation, and is expressed in cm of H2O.[1,7] Once the measurement has been obtained, the abdomen is drained and the volume is recorded. To measure

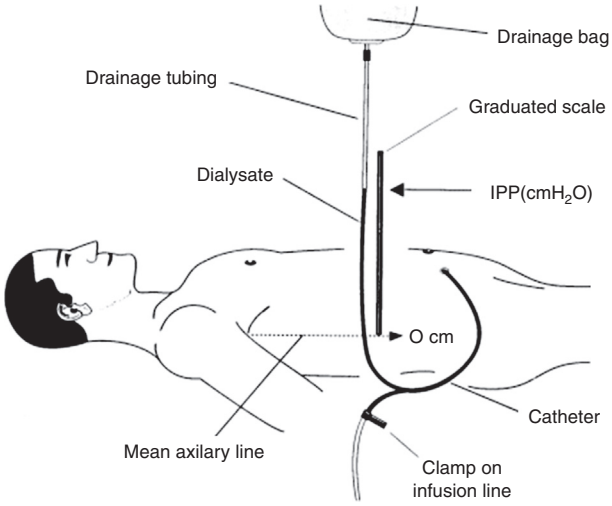

Fig. 1 – Scheme of intraperitoneal pressure measurement (IPP) using a ruler and the drain line of a PD bag with Y system.
***Source*: Mathieu et al.,[7] with permission.**