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Different Clinical Practice for Hemodialysis in Mexico and Colombia

Diferentes Prácticas Clínicas en Hemodiálisis en México y Colombia

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Abstract:

Chronic kidney disease is the structural or functional damage of the kidneys for more than three months and is considered a public health problem, since one out of every ten adults suffers from it. Hemodialysis is a therapeutic modality that replaces kidney function (excretion of waste products, regulation of water balance and regulation of the acid-base balance) improving the quality and years of life in patients with chronic kidney disease. However, the clinical practices used (dialyzers, duration of hemodialysis sessions, vascular access and health personnel) vary in each country, having an impact on the quality of life and the patient's mortality. Objective: To describe the differences in the reuse of dialyzers, duration of hemodialysis sessions, goals for the type of vascular access used and the health personnel who are in each renal unit. Conclusions: The differences that exist in clinical practices for hemodialysis between Mexico and Colombia are given from the health standards, however, it is necessary to reinforce aspects in both countries to provide better care to patients with chronic kidney disease.

Keywords:

Chronic kidney disease, clinical practice in hemodialysis, Mexico, Colombia

Resumen:

La enfermedad renal crónica es el daño estructural o funcional de los riñones por más de tres meses y es considerado un problema de salud pública, ya que uno de cada diez adultos la padecen; la hemodiálisis es una modalidad terapéutica que sustituye las funciones renales (excreción de productos de desecho, regulación del equilibrio hídrico y regulación del equilibrio ácido-básico) mejorando la calidad y los años de vida en los pacientes que padecen enfermedad renal crónica. No obstante, las prácticas clínicas empleadas (dializadores, duración de las sesiones de hemodiálisis, acceso vascular y el personal de salud) varían en cada país, lo que tiene un impacto en la calidad de vida y mortalidad del paciente. Objetivo: Describir las diferencias del reusó de los dializadores, duración de las sesiones de hemodiálisis, tipo de acceso vascular empleado y el personal de salud que debe tener una unidad renal entre México y Colombia. Conclusiones: Las diferencias que existen en las prácticas clínicas de hemodiálisis entre México y Colombia son dadas desde su normativa, no obstante, es necesario reforzar aspectos en los dos países para brindar una mejor atención al paciente con enfermedad renal crónica.

Palabras Clave*:*

Enfermedad renal crónica, prácticas clínicas en hemodiálisis, México, Colombia

INTRODUCTION

Chronic kidney disease (CKD) is considered a public health problem as one out of ten adults suffers from it, thus affecting close to 10% of the world's population.[1] However, it is projected that this percentage will increase due to the fact that currently is caused mainly by entities that have a high prevalence like arterial hypertension (AH), diabetes mellitus (DM) and the renal vascular disease.[2] In Latin America the number of people who have had access to some renal replacement therapy (RRT), hemodialysis (HD), peritoneal dialysis (PD,) and kidney transplant (KT) has been increasing as the years go by. In 1991, approximately 48,000 people attended some RRT therapy. By 2013, this number increased to 322,110 people; being the HD the therapy of choice.[3,4] In Colombia, by 2015, 979,409 people were identified with CKD. The prevalence of this disease was 2 people per 100 inhabitants being more frequent in women (prevalence of 2.5) than in men (prevalence of 1.7). For CKD stage V was

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of 66.8 per 100.000 inhabitants (men 78.4 per 100.000 inhabitants, women 57,3 per 100.000 inhabitants), with an incidence of 11.01 per 100.000 inhabitants.[5] By, 2015 in Colombia, 30,844 people were identified with RRT.5 So CKD and dialysis treatment contribute with 64% of the total cost attributable to high-cost diseases in this country.[6] In Mexico there is no national registry of patients with chronic kidney disease, but if you apply the average percentage of sick people in other countries (which is equivalent to 0.1% of the population), it can be estimated that by 2015 there were over 102,000 chronic kidney patients in the country7. The number of people in renal replacement therapy is 43.50 per 100,000 inhabitants, of which 80% are treated in the Instituto Mexicano del Seguro Social (IMSS), which estimated an incidence of patients with CKD of 377 cases per million inhabitants and a prevalence of 1.1.[7,8] The IMSS, in the year 2009, estimated that the CKD took third place in their expenditure, with an investment of $4.712 million in a population that represents the 4% of their insured persons. This makes clear that this expenditure is very important for patients with CKD.[8] HD is an extracorporeal blood purification technique used to replace the essential functions of the kidney (the excretion of waste products, nitrogen and acids (urea, creatinine), regulation of water balance and regulation of the acid-base balance)[9] and to improve the quality and years of life in patients with CKD.[10] It is made up of different variables implemented differently in each country.[11] The objective of this review is to describe the differences that exist between the reuse of dialyzers, duration of hemodialysis sessions, goals for the type of vascular access use and the health personnel that each renal unit must have in Mexico and Colombia.

CHRONIC KIDNEY DISEASE

CKD is defined as the presence of alterations in the structure or renal function for more than three months, with health implications. In the same way, it is considered CKD when the filtration rate (GFR) is < 60 mL/min/1.73 m2 SC (for a time of more than three months).[12] It is caused mainly by AH and DM.[13,14] The diagnosis of CKD is determined on the basis of the so-called markers of kidney damage (high albuminuria, urine sediment abnormalities, electrolyte and other abnormalities due to tubular disorders, histological structural alterations, structural alterations in renal transplant image tests) or the reduction of GFR below 60 ml/min/1.73 m2.[15] The ERC is classified based on the reduction of GFR and the increase of albuminuria.[15,16]

Classification of chronic kidney disease according to GFR

Stadium 1: kidney damage with normal or elevated GFR (GFR > 90 ml/min/1.73 m2)

Stadium 2: Kidney damage with mildly decreased GFR (GFR 60-89 ml/min/1.73 m2)

Stadium 3: mildly to moderately decreased GFR (GFR 30-59 ml/min/1.73 m2)

Stadium 4: severely decreased GFR (GFR 15-29 ml/min/1.73 m2)

Stadium 5: kidney failure, the patient requires dialysis (GFR < 15 ml/min/1.73 m2)[16]

Classification of chronic kidney disease according to albuminuria

Category A 1: normal to mildly increased (albuminuria < 30 mg/g)

Category A 2: moderately increased (albuminuria 30-300 mg/g)

Category A 3: severely increased (albuminuria >300 mg/g)15

As mentioned earlier, the kidney replacement treatment is started when GFR (mL/min/1.73m2) is lower than 15 and albuminuria is higher than 300 mg/g. For this, there are two types of treatment: dialysis (hemodialysis or peritoneal dialysis) or kidney transplant.[15]

HEMODIALYSIS

The hemodialysis is an invasive procedure that replaces kidney function to remove water and solutes, to maintain the acid-base balance and electrolyte imbalance (it does not replace the renal metabolic or endocrine functions) by means of a machine and a semipermeable membrane.[17] The basic mechanism consists on bringing together two liquid spaces: blood and dialysis liquid in a semipermeable membrane, for which a filter or dialyzer is used. This

semipermeable membrane allows blood and solutes of small and medium molecular weight (sodium, potassium) to circulate through it. It does not allow the passage of solutes of great molecular weight because they tend to be important blood components such as proteins.[18] The two physical principles involved in the process are diffusion or transport by conduction and ultrafiltration or transport by convection. In the transport by diffusion the solutes pass through the semipermeable membrane of the dialyzer passing from a medium of higher concentration to one of lower concentration. Convection transport has as main objective to eliminate the liquid obtained in the period between dialysis (under this principle the liquid is extracted from the blood).[19]

DIFFERENCES OF THE HEMODIALYSIS CLINICAL PRACTICES IN MEXICO AND COLOMBIA.

Dialyzers

The dialyzer is the main component of hemodialysis, as it is the compartment where the elimination of retained earnings, and uremic toxins generated by chronic kidney disease.[20] The Official Mexican Standard NOM-003-SSA3-2010, for the practice of the hemodialysis, allows the reprocessing of filters, a procedure in which a filter of dialysis is processed under current sanitary conditions to be exclusively reused in the same patient. It also specifies that prior to the start of the dialysis, the dialysis filter must be rinsed making sure, by means of specific procedures, that there are no residues of the sterilizing material according to each type of agent used, which in that case, will need to be reprocessed.[21] In Colombia, the guide for the management of chronic kidney disease and model for the prevention and control of chronic kidney disease developed by the Ministry of Social Protection (MPS) and the Support Program of the Health Reform (PARS), says that universal precautions should be followed in hemodialysis units for the prevention of bloodborne pathogens.[22] The regulations of MPS and PARS are fulfilled by: cleaning and disinfecting the instruments, machines and surfaces, after each treatment; avoiding passing on articles between patients; frequently washing hands and using disposable gloves; using facial and eye protection.[22] This means that in Colombia the guide for the management of chronic kidney disease and the model of prevention and control of chronic kidney disease established by MPS and PARS, does not specify the reuse of filters so this practice is not carried out in that country.[22]

Duration of hemodialysis sessions

When HD treatment began to be available in the 1960s in the United States, the frequency of the therapy was three times per week with a duration of 8 to 10 hours. The complication of dialysis imbalance syndrome during and after HD sessions was common, particularly with shorter sessions in which urea and fluid were eliminated more quickly; so, it was increased the dialysate sodium to be able to perform sessions of 4 hours, three times per week.[23] Currently, the Dialysis Outcomes and Practice Patterns Study (DOPPS) have shown that a longer treatment time is associated with lower mortality in patients with CKD (a treatment time of 30 minutes longer was associated with a 6% lower mortality rate).[11] Hemodialysis sessions in Mexico have a frequency of three times a week with a duration of three hours, however, this varies according to the ease of access the patient has to attend therapy (the average of sessions per patient six months is 1.2 per week with an interval between 0.8 and 1.3 within the five categories of the hemodialysis units).[21] In Colombia, the standard dose of hemodialysis should be given in three sessions a week, four hours per session, even if it is reached the optimal dialysis dose (Kt/V), that is, a Kt/V >1.2. The time of treatment should be increased in patients with cardiovascular problems or hemodynamic instability.[22]

Vascular access

It is the anatomical point where the patient's bloodstream will be accessed and by means of which the blood is extracted and returned once it has gone through the extracorporeal extra-renal depuration circuit. There are three types of vascular access 1) native arteriovenous fistulas (FAVN); 2) prosthetic arteriovenous fistulas (FAVP); 3) the central venous catheter (CVC).[24] In the

vascular access, it is recommended as first choice the native arteriovenous fistula, as compared to prosthetic arteriovenous fistulas or central venous catheters it has a lower number of infections.[25] In Mexico, although the Official Standard NOM-003-SSA3-2010, for the practice of hemodialysis does not specify the minimum percentage for the construction of FAVN, the renal units take as reference the goal established by the guides KDOQI of the 65% (65% of patients in each renal unit must have FAVN as vascular access for the realization of HD).[21]

The guide for the management of chronic kidney disease and model of prevention and control of kidney disease in Colombia recommend the construction of the native arteriovenous fistula whenever possible; specifying in the high cost account, (evidence-based consensus for the choice of minimum indicators for the analysis of clinical outcomes in peritoneal dialysis and hemodialysis) that the goal regarding the use of central venous catheter should be less than 10%.[22]

Healthcare professionals

It is recommended that the renal units are multidisciplinary, being the most appropriate that they are constituted by: a nephrologist, a vascular surgeon, nurses, a nutritionist and having the support of a team of psychologists that make it less difficult, both for the patient and the family, the acceptance of CKD and the start of a renal replacement therapy.[25] The Official Mexican Standard NOM-003-SSA3-2010 and in the resolution number 00002003 of 2014 of Colombia specify the health personnel every renal unit must have to start functioning (the health personnel to start a renal unit in Mexico and Colombia is summarized in Table 1).

It is important to emphasize that the Official Mexican Standard specifies the function of each person. The resolution number 00002003 of 2014 of Colombia specifies nursing and nursing assistant because, in spite of working together, they fulfill different functions.[26]

Table 1. Health personnel according to official standards to start a renal unit in Mexico and Colombia

Official Mexican Standard NOM-003-SSA3-2010	**Resolution Number 00002003 of 2014 of Colombia**
Specialized physicians in nephrology with certificate of specialization and professional certificate legally issued and registered by the competent educational authorities	Specialized physician in nephrology
General Physician	General physician, with a certificate in control of the most frequent complications in renal dialysis and support
Professional and technical nursing staff	Nurse Nursing Assistant
	Psychologist Dietician nutritionist Social worker.

Source: *own elaboration from the Official Mexican Standard NOM-003-SSA3-2010 and the Resolution Number 00002003 of 2014 of Colombia*[21,26]

CONCLUSIONS

The differences between clinical practices of hemodialysis in Mexico and Colombia are based on their health standards; however, it is necessary to strengthen in both countries fundamental aspects like the standard goal for the construction of native arteriovenous fistula. Mexico must provide comprehensive care to the patient with chronic kidney disease, adding to their treatment a psychologist, a nutritionist and a social worker; since currently, it only offers the services of a general physician, a nephrologist and a nurse.

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