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REVISIONES

Preventive Measures to Avoid Health Complications from the use of catheters in patients with Spinal Cord Injury

Medidas preventivas para evitar complicaciones de salud derivadas del uso de sondajes vesicales en pacientes lesionados medulares

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Keywords: Paraplegia; Urinary incontinence; Nursing assessment; Permanent Catheter; Bacteriuria.

Palabras clave: Paraplejia; Incontinencia urinaria; Evaluación en enfermería; Catéter de permanencia; Bacteriuria.

ABSTRACT

Introduction: Spinal cord injury is one of the most tragic events that can befall a person for the devastating consequences associated with paralysis of 2 or 4 members in the form of paraplegia or quadriplegia, loss of sensitivity, bladder dysfunction, bowel, sexual and consequently transcendental psychologic social, labor and economical consequencies.

Objectives: Main objective is determining if certain types of probes and catheterization techniques are the best for preventing long-term complications in urinary incontinence.

Methodology: Search strategies for identifying articles of this review include databases such as Cinahl, Pubmed, Virtual Health Library, CSIC, and Cochrane Library. Searches were conducted using the keyword system: We carried out a search using Mesh descriptors / Mesh and a manual search of articles in Nursing journals from Spain and foreign countries.

Results: There are no definitive studies that reveal that the incidence of UTI improves with some kind of technique, strategy or probe type. The main difficulty for these studies is the long duration; many patients leave the study.

Conclusions: The available data on intermittent catheterization does not provide convincing evidence for the specific technique (sterile or clean), probe type (coated or uncoated), method (single use or multiple use), people (patient or other), or strategy is better than another for all clinical settings. The current evidence is uninformative and well-designed studies are recommended. Evaluating the impact on quality of life involves the use of different methods of evacuation in patients with spinal cord injury using a specific questionnaire validated in Spanish: King's Health Questionnaire

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RESUMEN

Introducción: La lesión medular es uno de los sucesos más trágicos que puede acaecerle a una persona por las devastadoras consecuencias que conlleva la parálisis de los 2 ó 4 miembros en forma

de paraplejía o tetraplejía, pérdida de las sensibilidades, disfunción vesical, intestinal, sexual y consecuentemente trascendentales secuelas psicológicas, sociales, laborales y económicas.

Objetivos: El objetivo principal es determinar si ciertos tipos de sondas y técnicas de colocación de la sonda son mejores para la prevención de complicaciones a largo plazo en la incontinencia urinaria.

Metodología: La estrategias de búsqueda para la identificación de los artículos de esta revisión los buscamos en bases de datos como Cinahl, Pubmed, Biblioteca Virtual de la Salud, Csic, Biblioteca Cochrane Plus. Las búsquedas se realizaron mediante el sistema de palabras clave. Se llevó a cabo la búsqueda mediante los descriptores DeCS /MeSH y además una búsqueda manual de artículos en revistas especializadas de Enfermería tanto españolas como extranjeras.

Resultados: No hay estudios definitivos que revelen que la incidencia de la infección urinaria mejore con alguna técnica, estrategia o tipo de sonda; la dificultad de estos estudios consiste pues en que se necesita un periodo largo de tiempo y muchos pacientes abandonan el estudio.

Conclusiones: Los datos disponibles sobre el sondaje intermitente no aportan pruebas convincentes de que la técnica especifica (estéril o limpia), tipo de sonda (recubierta o no recubierta); método (único uso o uso múltiple), personas (paciente u otro), o estrategia sea mejor que otra para todos los contextos clínicos. Las pruebas actuales son débiles y se recomiendan estudios bien diseñados. Valorar el impacto en la calidad de vida, supone la utilización de distintos métodos de evacuación urinaria en pacientes con lesión medular, utilizando un cuestionario específico y validado al español: King´s Health Questionnaire

INTRODUCTION

A spinal cord injury affects the regulation of the organs below the level of injury, creating a wide spectrum of health problems that can vary the chronicity of the process and also alter the signs and symptoms which can cause complications. The long-term complications include musculoskeletal complications (wheelchair postural problems, contractions that can lead on para-articular ankylosis ossifications, pathological fractures due to immobility osteoporosis) spasticity (inordinate increase tonic stretch reflexes in relation to the tendon hyperreflexia) pressure ulcers (caused by immobility, absence of pain and decreased soft tissue) and autonomic dysreflexia (it happens in patients with lesions above D5-D6 due to deregulation of vegetative nervous system, causing tachycardia and elevated blood pressure above 250-300 mg Hg).

Urological complications: (neurogenic bladder, urinary tract infections, urinary tract stones, vesicoureteral reflux, fistulae and diverticula) Gastrointestinal complications (constipation, fecal incontinence) progressive neurological deterioration, respiratory disorders, pain, impaired reproduction and sexuality. [1-3]

The effects of spinal cord injury on bladder function depend on the location of the spinal cord injury. There will be two types of bladder dysfunction automatic bladder and flaccid bladder.

Automatic bladder appears when injury is above the micturition reflex center in the sacral portion of spinal cord in T12 or above. People lose the sensation they need to control voluntary urination, coordinated on the micturition center reflex. When the bladder is full enough, elastic receptors activate detrusor muscle, and spontaneous uncontrolled bladder contraction is stimulated by simple reflex arcs. The automatic bladder is often not emptied efficiently. Muscle spasm of vesical (sphincter) may prevent the complete expulsion of urine bladder and lead to hyperextension.

Flaccid bladder is caused by a lesion of the lower motor neuron, with damage in the reflex micturition center in the sacral portion of the spinal cord. Reflex activity and bladder activity are reduced and generally result in an over distended bladder.

Problems arising from dysfunction of detrusor muscle and sphincter also include urinary incontinence, recurrent kidney infections and high back pressure in kidneys. Finally, both can lead to serious kidney disease.

The primary aim of treatment of neurogenic bladder is maintaining continence, ensure low bladder pressure (to avoid kidney damage) and prevent or reduce infection.

Treatment options include intermittent urethral catheterization, permanent urethral or suprapubic catheterization, timed voiding, condom catheter use (only for men), cyto-plasty and increased urinary diversions[4]

In 1844 Stromeyer first described catheterization as a way to evacuate residual volume regularly and frequently [5]. During World War II this procedure was applied in the treatment of neurogenic bladder in adults with spinal cord injury howewer the method of applying the concept of Clean Intermittent Self Catheterisation (CISC) is due to the urologist Lapides The 1970_s, where he showed the efficiency and safety long-term effects of this therapeutic modality treatments used against [6]
.
Intermittent catheterization involves passing a catheter into the bladder to drain urine from the urethra or other channel as continent urinary diversion. The probe is removed immediately after finishing the urine drainage. Intermittent catheterization can be performed on people of all ages, including the elderly and children four years old with parental supervision, or caregivers can be trained to perform the procedure. Disabilities such as blindness, lack of perineal sensation, tremor, mental disability and paraplegia do not necessarily prevent use of the tecnique [7]

Individualized care plans help identify the appropriate frequency of probing, based on the exposure of urinary disorders and impact on quality of life.

The advantages of IC versus permanent catheterization include:

- More opportunity for self-care and independence of individuals.
- Reducing the risk of common complications associated with ndwelling catheter.
- Reducing the need for instruments and artifacts such as drainage bag.
- Greater freedom of expression for sexuality.
- Possibility of reducing urinary symptoms (frequency, urgency, incontinence) between each probing interval [8]

Types and characteristics of the probes for intermittent catheterization can vary considerably; simple uncoated probes (PVC hard plastic) are simply covered with a sterile container. Most of the probes are used with a separate lubricant, although it is a personal choice and some patients do not use lubricants (only water). The cleaning

technique varies with soap and water, boiling, disinfectants submerging or microwaving, the probes are cleaned and dried then stored in a suitable container.

Coated catheters are for single use (cannot be cleaned or reused). They are designed to improve the probe's lubrication and ease the insertion so as to reduce trauma and urinary infections.

The most common coatings are hydrophilic water is added to the probe to form a lubricant layer) or pre-lubricated (where the probe is provided with a pre-packaged water-soluble gel coating) [9-11]

MATERIAL AND METHODS

Search strategy for identifying items was conducted by searching databases such as CINAHL, PUBMED, HEALTH LIBRARY, CSIC, and Cochrane Library.
The date for searching these studies for this review was done from November 2001 until May 2012.
A manual search of articles in nursing journals both Spanish and foreign was also conducted from January 2006 until May 2012:

- Nursing Faculty
- Clinical Nursing
- Nursing
- Intensive Nursing
- Proceedings urological

The searches were conducted using the keyword system: We carried out a search using Mesh descriptors / Mesh
The search terms used Mesh jurisdiction

Table I

Paraplegia	AND	Bacteriuria
Urinary Incontinence	OR	Nursing Assessment
Catheter indwelling	OR	Paraplegia
Spinal cord injuries	OR	Nursing Assessment

The DeCS search terms used were:

Table II

Paraplegia	AND	Bacteriuria
Urinary incontinence	OR	Nursing Assessment
Cathter inwelling	OR	Paraplegia
Spinal cord injuries	OR	Nursing Assessment

Articles obtained:

45 articles in Medline (PubMed).
Cinahl 5 of which 4 were repeated in Medline.
20 in VHL.
7 in Cochrane Library.
25 articles from journals.

Several items were discarded for not being between the years of searching. Assessed articles were those that were focused on the incidence of UTI in intermittent probe users who tried different catheterization techniques (sterile or clean); different types of probes (pre-lubricated with lubricant or separately); sterile probes (single use) or clean probes (all purpose); catheterization by the patient or by third people, and other strategies to reduce UTI, including cleaning probes.

RESULTS

There are no definitive studies showing that bacteriurias incidence improves with any specific technique, strategy or probe. The difficulty in such studies is that it takes a long time and many patients leave the study explains Moore. [9]

Harris refers the lower rate of bacteriuria is associated with the insertion of catheters and suggests creating a urinary care protocol excellence, where only essential urinary catheters inserted, using an aseptic technique and proper care[12]

In a prospective observational study of quality assessment in spinal cord injury patients conducted by Sánchez-Raya there are no differences except in the limited dimension of roles, where the best score is from permanent collector's carrier group than the IUC and intermittent catheterization. [13]

In the prevention study of urinary tract infections associated with urinary catheters Dumont states that based on evidence appropriate care practices indicating the use of a memory system for extraction catheter may be physical or virtual and these actions empower hospitalized patient safety. [10]

DISCUSSION

Different methods of probing and probe types do not allow us to quantify the influence in the quality of life of spinal cord patients and we would have to separately answer the following questions:

- The use of sterile or clean technique
- The use of coated or uncoated probe
- Single use probe or multiple use
- Placement of the probe by the patient himself or by a third part

As Moore suggests large randomized controlled trials will be needed to answer these questions as these studies are difficult to perform. It is suggested that the external-hospital sterile technique is not practical but inside the hospital, the growing concern about infection control indicates that a sterile technique is needed for safety [(9)]

Further research is recommended to allow cost efficiency it is important to perform new researches because there is a great price variation between different probe types.

Satisfaction, acceptability and patient preference are secondary outcome variables that need to be evaluated in future trials and these results would be particularly useful when evaluating the cost-effectiveness of single-useor reusable products [(9)]

CONCLUSIONS

There is insufficient evidence to demonstrate the effectiveness of a probe type, technique or strategy in particular. Variations in clinical practice and the increasing use of single-use probes with higher associated costs shows that a randomized designed controlled trial is needed.

Early removal of permanent urinary catheters is associated with a lower risk of urinary tract infection and a shorter stay in hospital. Clinical features of these infections in neurogenic bladder due to injury of spinal cord patients need appropriate strategies for clinical, microbiological and epidemiologic criteria.
The main objective is to determinate if certain types of probes and catheterization techniques are the best for preventing urinary incontinence, long-term complications and secondary objectives are: recognize the influence in quality of life, reduction of urinary tract infections and cost-effectiveness in long-term bladder treatment.

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ANNEX I

King's Health Questionnaire. Assessment of quality of life in patients with spinal cord injury comparing different methods of bladder emptying.

Tabla 1 – King's Health Questionnaire

Variable	*Dimensión*	*Subdimensión*	*Indicador*	*Subindicador*
Percepción de la mujer	Descripción del estado actual de Salud		Muy buena Buena Regular Mala Muy mala	Puntuación otorgada a cada indicador
Impacto de la Incontinencia urinaria	Influencia de la IU		Nada Un poco Moderadamente Un montón	Puntuación otorgada a cada indicador
Limitación de Roles	Tareas domésticas, trabajo y actividades fuera del hogar	Influencia de la IU en sus tareas domésticas y/o actividades fuera del hogar	Nada Levemente Moderadamente Mucho	Puntuación otorgada a cada indicador
Limitación Física	Actividades físicas y capacidad para viajar	Influencia de la IU en las actividades físicas y en la capacidad para viajar	Nada Levemente Moderadamente Mucho	Puntuación otorgada a cada indicador
Limitación Social	Interacción social, con el grupo de amigos y vida familiar	Influencia de la IU en vida social, en la relación con los amigos y con la familia.	Nada Levemente Moderadamente Mucho	Puntuación otorgada a cada indicador
Relaciones Personales	Relaciones de pareja y vida sexual	Influencia de la IU en la relación de pareja y vida sexual	No se aplica Nada Levemente Moderadamente Mucho	Puntuación otorgada a cada indicador
Emociones	Depresión, ansiedad y baja autoestima	Influencia de la IU en el estado de ánimo y autoestima	Nunca Levemente Moderadamente Mucho	Puntuación otorgada a cada indicador
Sueño y energía	Actividad y reposo	Influencia de la IU en el patrón de sueño, sensación de agotamiento	Nunca Algunas veces A menudo Siempre	Puntuación ortorgada a cada indicador
Síntomas Asociados	Presencia y frecuencias de síntomas asociados	Sí No	Un poco Moderadamente Mucho	Puntuación otorgada a cada indicador

ANNEX II

King's Health Questionnaire. Assessment of quality of life in patients with spinal cord injury comparing different methods of bladder emptying.

Tabla 2 – Problemas relacionados con la lesión medular

Problemas	*Ordenar de mayor a menor (1–9)*
Problemas de deambulación	
Trámites administrativos	
Uso de trasportes públicos	
Disfunción sexual	
Problemas con la defecación	
Problemas urinarios	
Úlceras	
Prejuicios con la gente	
Otros	

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