



Urologic status of 74 spinal cord injury patients from the 1976 Tangshan earthquake, and managed for over 20 years using the Credé maneuver

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Objective: To evaluate the urologic safety of long-term Credé maneuver as bladder management in spinal cord injured patients.

Methods: Seventy-four paraplegics were included in this cross-sectional study. They were injured in the Tangshan earthquake in 1976. All patients have large volume (flaccid) bladders and have practiced the Credé maneuver for more than 20 years to expel urine. Current residual urine volume and urologic complications were investigated.

Results: 93.2% of patients have residual urine larger than 100 ml and 50% of cases larger than 300 ml. The prevalence of urologic complications is high: pyuria in 82.4%, urinary lithiasis in 31.3%, ureteral dilatation in 59.5%, hydronephrosis in 35.1% and renal damage in 16.2%. Men are more susceptible to upper urinary tract deterioration than women ($P < 0.05$).

Conclusion: The Credé maneuver is not safe for long-term use in spinal cord injury patients, especially in men.

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Introduction

On July 28, 1976, a great earthquake (Richter scale 7.8) happened at 3:42 in the early morning in Tangshan, a city with a population of over one million in northern China's Hebei province. It caused more than 240 000 deaths and 420 000 injuries of which about 5000 had spinal cord injuries, approximately 1.2% of all injuries. Except for those who died in the early days, most patients were transferred to other cities for treatment. In the following 4 years, the Government set up 18 rehabilitative hospitals and sanatoriums, and 3714 spinal cord injured (SCI) patients, mostly complete paraplegics with T12/L1 fracture/dislocation, returned to live in the newly reconstructed city.

The Credé maneuver is widely used by SCI patients in China to expel urine and most patients think it is a simple and effective technique for bladder management. However, is it safe for long-term usage? To answer this question, we assessed the current urologic status of 74 SCI patients who were injured in the earthquake and have used this method for more than 20 years.

Methods

This cross-sectional study involved 105 SCI patients who lived in Tangshan Paraplegic Rehabilitation Village (a village for married couples among paraplegics) or Municipal Paraplegic Sanatorium. A questionnaire was filled out by all the patients and their attending physicians. Among them, 74 patients were injured in the 1976 earthquake and have used the Credé maneuver regularly to expel urine for more than 20 years. In November 1999, a whole body check-up was performed, with particular attention given to the urologic status and complications. Urinary infection (pyuria) was determined by microscope examination ($WBC > 5/HP$). Renal function damage was determined by both blood urea nitrogen (> 7.2 mmol/l) and serum creatinine (> 124 μ mol/l). Residual urine, lithiasis, ureteral dilation and hydronephrosis were detected by B-mode ultra-sonography. No urodynamic test was applied.

There were 33 men and 41 women with an average age of 46 years (38 to 62 years old). All were complete paraplegics. The commonest vertebral injury was T12/L1 fracture/dislocation (64 cases, 86.5%). Sixty-seven (90.5%) had lost the anal wink reflex. The mean water intake every day was 2500 ± 500 ml, with 500 ml in the morning to flush the urinary tract. Most patients performed Credé maneuver 5 to 7 times a day. The performed average volume expelled at one time was 300 to 400 ml.

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Table 1 Urologic status of 74 SCI patients

	Men (no of patients: 33)	Women (no of patients: 41)	%
Residual urine (ml)			
~100	0	5	
~200	11	21	
~300	17	13	
>300	5	2	
Urinary infection			82.4
Symptomatic pyuria	5	2	
Asymptomatic pyuria	23	31	
Liathiasis			31.1
Bladder	9	7	
Ureter	2	3	
Kidney	2	0	
Ureteral dilatation	24	20	59.5
Hydronephrosis	17	9	35.1
Renal damage	9	3	16.2

A χ^2 test, with a significance level of 0.05, was used for statistical analysis.

Results

The current urologic status of this SCI population is shown in Table 1. Before adopting the Credé maneuver, all the patients had used indwelling catheters for 1 to 2 years. All patients had suffered repeated or chronic urinary tract infections over the past 23 years. The incidence of symptomatic urinary tract infections such as fever and flank pain with pyuria was 1–3 times a year. Sixty-nine cases (93.2%) had residual urine larger than 100 ml, and 37 cases (50%) larger than 300 ml. The current prevalence of urinary complications is also high, pyuria in 61 (82.4%), urinary stones in 23 (31.1%), ureteral dilatation in 45 (59.5%), hydronephrosis in 26 (35.1%) and renal damage in 12 (16.2%). Statistical analysis shows that men seem more vulnerable than women to ureteral dilatation (72.7% vs 48.8%, $P < 0.05$), hydronephrosis (51.5% vs 22.0%, $P < 0.01$), and renal damage (27.3% vs 7.3%, $P < 0.05$).

Discussion

The options for bladder management in SCI patients are mainly determined by medical efforts and social preferences. Since the 1970s, clean intermittent catheterization (CIC) has been widely practiced in developed countries. However, it has not been accepted widely in China. Inconvenience and difficulty in performance are the main reasons. For long-term bladder management, most SCI patients with large volume bladders prefer the Credé maneuver to expel urine, while most SCI patients with small volume bladders prefer condom collector bags in men, or a diaper in women. A minority of patients favor indwelling catheters, or spontaneous reflex voiding induced by percussions.

However, in contrast to developed countries, urinary complications, especially chronic renal failure, are still the leading cause of late death among SCI patients in China.

The Credé maneuver is thought to be a simple and effective voiding technique for areflexic or flaccid bladders, which have a large bladder capacity, low vesical storing pressure, and incompetent or relaxed external and/or internal urethral sphincter.¹ A recent study advocates that the Credé maneuver should be recommended to patients with sacral SCI affecting the spinal micturition center or cauda equina syndrome.² Although no urodynamic study was carried out, as most patients lost their anal wink reflex, we think they also have areflexic or flaccid bladders.³ From this study, we think it may be true for women because they have a shorter and wider urethra, which allows urine to flow easily and rapidly, and then a relatively lower intravesical pressure and shorter time are needed. However, in the long term, large volume residual urine, chronic or repeated urinary infections, and increased intravesical pressure produced by the maneuver can still cause upper urinary tract deterioration. For men, the Credé maneuver is more dangerous than for women and upper urinary damage from vesicoureteral reflux happens earlier and is more severe.

In conclusion, the Credé maneuver, even in large volume flaccid bladders, can cause renal damage. It is not safe for long-term use, especially in men. CIC is the best choice,⁴ and we are taking efforts to make it accepted by our patients.

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