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Original Article

Practice patterns of Japanese physicians in urologic surveillance and management of spinal cord injury patients

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Study design: Analysis of answers to a new questionnaire.
Objective: To examine current practice patterns of physicians in the urological surveillance and management of spinal cord injury (SCI) patients in Japan.
Setting: Nationwide questionnaire survey to physicians in Japan.
Methods: A Japanese version of the 14-item questionnaire survey carried out in US was mailed to 770 members of the Japanese Neurogenic Bladder Society (JNBS).
Results: We received answers to our questionnaire from 333 (43.2%) members of JNBS. The responders were all urologists. For surveillance of the upper urinary tract (UUT), 239 (71.8%) respondents preferred abdominal ultrasound. Cystometry was performed routinely by 174 (52.3%) respondents for the evaluation of vesicourethral function. Cystoscopy was carried out in cases of hematuria (88.0%) and bladder stone (55.3%). Surveillance of the urinary tract was performed every year in 154 (46.2%). For detection of bladder cancer, which 119 (37.9%) respondents have experienced, 94.9% physicians perform cystoscopy, 76.3% urinary cytology, and 60.4% ultrasound. For initial treatment of detrusor-sphincter dyssynergia (DSD), 225 (69.2%) respondents chose α-blocker, and 94 (28.9%) chose clean intermittent catheterization (CIC) with/without anticholinergic agent(s). For initial treatment of overactive bladder, 245 (74.7%) chose anticholinergic agent(s) only and 63 (19.2%) chose anticholinergic agent(s) with CIC. For initial treatment of areflexic bladder, 233 (73.7%) chose CIC and 63 (19.9%) chose Credé maneuver or tapping.
Conclusions: This survey shows that there are some differences in urological surveillance and management of SCI patients between Japan and the US. Reasons for the discrepancy should be examined.
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Keywords: spinal cord injury; neurogenic bladder; urologic complication; urologic surveillance; bladder cancer

Introduction

In neuropathic bladder due to spinal cord injury (SCI), urinary disturbance varies according to the area and severity of injury of the spinal cord.[1] Accordingly, various urologic troubles arise in the patient with SCI.[2] The management of lower urinary tract (LUT) disorders is very important in order to prevent serious complications that may result in upper urinary tract (UUT) disorders such as hydronephrosis. There have been arguments as to the strategy of observation and therapeutic approaches in SCI patients. For improvement in life expectancy and quality, research and evidenced-based practices related to urinary tract dysfunction are requisite. Recently, results of questionnaires on the current practice patterns in urological surveillance and management of SCI patients were reported in the United States (US) and United Kingdom (UK).[3,4] The present inquiry by questionnaire was performed on the current practice patterns of the physician (urologist) in urological management of SCI patients in Japan.

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Methods

A Japanese version of the 14-item questionnaire (see Appendix A) with which a survey was carried out recently in the US[3] was mailed to 770 members of the Japanese Neurogenic Bladder Society (JNBS) in January 2004. The society consists of urologists, neurologists, pharmacologists, and others. More than 90% of the members of the society are urologists. The number of urologists of JNBS is approximately 10% of the total members of the Japan Urological Association (JUA), which is the only official society of urologists in Japan. We thought that almost all of the members of JNBS were engaged more routinely in urologic management of patients with SCI than those of any other nationwide academic medical society. Answers to the questionnaire returned to us by the deadline (within 1 month) were analyzed in this study. The first eight questions concern surveillance of the neuropathic bladder and bladder cancer due to spinal cord lesions, and the remaining questions deal with treatment modality and background of the respondents. The US and Japanese questionnaires were not identical, because Razden *et al*[3] did not publish details of their questionnaire.

Results

We received a response to our questionnaire from 388 (50.3%) members of JNBS. In all, 55 members declined to answer our questions because they were not engaged in urological management of SCI patients. A total of 333 (43.2%) urologists out of the JNBS members replied to our questions. Some of them did not answer all questions in the questionnaire because of unknown reasons. In total, 314 (40.8%) urologists answered all of the questions.

UUT surveillance

For surveillance of UUT, 71.8% (239/333) respondents preferred abdominal ultrasound screening. Excretory urography (IVP), renal scintigraphy, and CT scan were chosen as a first-choice examination by 25.8% (86/333), 0.3% (1/333), and 1.2% (4/333) physicians, respectively. Three respondents (0.9%) preferred blood tests. The 239 respondents who chose ultrasound as a first-priority method of UUT survey performed CT scan in cases of urolithisis (57.8%: 138/239), severe urinary tract infection (UTI) or urosepsis (35.6%: 85/239), and hematuria (66.9%: 160/239). The other indications of CT scan are renal mass, renal atrophy by ultrasound, and others (28.5%: 68/239). For indication of IVP, they chose urolithiasis (81.6%: 195/239), severe UTI or urosepsis (10.5%: 25/239), and hematuria (59.8%: 143/239). The other indications of IVP were pyuria, hydronephrosis by ultrasound, and others (29.7%: 71/239).

LUT surveillance

Of the 333 respondents, 174 (52.3%) routinely perform cystometry for evaluation of vesicourethral function, 33 (9.9%) videourodynamics, 91 (27.3%) cystometry with image diagnosis, while 25 (7.5%) do nothing.

Cystoscopy is carried out in cases of hematuria (88.0%) and bladder stones (55.3%). In total, 22 physicians (6.6%) performed cystoscopy in all patients. Other indications of cystoscopy (12.1%) were mass of the bladder by ultrasound, abnormal findings in urinary cytology, and others.

Frequency of surveillance

Surveillance of UUT and LUT was performed every year by 154 (46.2%) physicians. In all, 73 (21.9%) respondents answered that they intended to do the surveillance every year but failed to actually do so. A total of 95 (28.5%) respondents did the surveillance less frequently than every year (eg every other year).

Bladder cancer

Of 314 respondents who answered the question on experience of bladder cancer in patients with SCI, 119 (37.9%) experience bladder cancer and 195 (62.1%) did not. For detection of bladder cancer (as a screening test, not including any further examination like a biopsy), 94.9% (316/333) physicians perform cystoscopy, 76.3% (254/333) urinary cytology, and 60.4% (201/333) ultrasound.

Treatment of neurogenic bladder

Details of the treatment choice for detrusor-sphincter dyssynergia (DSD) are shown in Table 1. Other treatments include radical transurethral resection of the prostate (TUR-P), anticonvulsants, urinary diversion, nerve block, and others.

Details of the treatment choice for bladder overactivity are depicted in Table 2. Other treatments include bladder instillation of a drug (anticholinergic agents or resiniferatoxin), electrical stimulation of the pelvic floor, pelvic floor exercise, and others.

Details of the treatment choice for areflexic bladder are shown in Table 3. Other treatments include cholinergic agents, α-blocker, urethral stent.

Background of the respondents

The respondents were eventually all urologists. Years since graduation from medical school of the respondents are as follows: 5 or fewer years in 6 (1.9%) respondents, 6 to 10 in 36 (11.2%), 11 to 15 in 54 (16.8%), and 16 or more in 225 (70.1%). There was no significant relationship between years since graduation and choice of treatment or examination (data were not shown).

Working places of the respondents are as follows: private office in 45 (14.1%) respondents, general hospital in 149 (46.7%), university hospital in 101 (31.7%), labor accident hospital in 12 (3.8%), and rehabilitation hospital in 12 (3.8%). There was no

Table 1 Treatment modalities of detrusor–sphincter dyssynergia in spinal cord injury patients (325 respondents)

Order of choice	*Treatment*					
	α-blocker	*CIC*	*Sphincterotomy*	*Stent*	*Catheter*	*Others*
1st	225	94	1	0	3	2
2nd	71	201	13	0	18	16
3rd	14	22	44	35	135	13
4th	5	1	50	68	43	5
5th	0	0	63	35	41	5
6th	0	0	5	5	4	22

CIC = CIC with/without anticholinergic agent(s); sphincterotomy = external urethral sphincterotomy; stent = urethral stent; catheter = catheter indwelling; others = details are mentioned in Results section

Table 2 Treatment modalities for overactive bladder in spinal cord injury patients (328 respondents)

Order of choice	*Treatment*			
	Antich	*CIC*	*CIC + antich*	*Others*
1st	245	13	63	7
2nd	34	73	175	29
3rd	31	118	45	17
4th	0	0	2	42

Antich = anticholinergic agents; others = details are mentioned in Results section

Table 3 Treatment modalities of areflexic bladder in spinal cord injury patients (316 respondents)

Order of choice	*Treatment*			
	CIC	*Credé/tapping*	*Catheter*	*Others*
1st	233	63	13	7
2nd	77	99	120	18
3rd	3	48	151	9
4th	0	5	11	30

Credé/tapping = Credé method or abdominal tapping; catheter = catheter indwelling; others = details are mentioned in Results section

statistical relationship between working place and choice of treatment or examination (data not shown).

Numbers of patients with SCI whom the respondents treated regularly per year are as follows: 10 or fewer cases in 230 (73.2%) respondents, 11–50 in 58 (18.5%), 51–100 in 15 (4.8%), 101–500 in 8 (2.5%), and more than 500 in 3 (1.0%).

Of the 15 respondents who treated 50–100 patients with SCI per year, 11 (73%) chose ultrasound screening and four (27%) chose IVP for UUT surveillance. For LUT surveillance, 40% (6/15) used cystometry, 40% (6/15) cystometry with image diagnosis, and 20% (3/15) videourodynamic examination. For initial treatment of DSD, 53% (8/15) chose clean intermittent catheterization (CIC) with/without anticholinergic agent(s) and 47% (7/15) chose α-blocker(s). For initial treatment of bladder overactivity, 53% (8/15) chose anticholinergic agent(s) only and 40% (6/15) chose anticholinergic agent(s) with CIC. For initial treatment of areflexic bladder, 80% (12/15) chose CIC and 20% (3/15) chose Credé method or tapping.

Of the 11 respondents who treat more than 100 patients with SCI per year, 8 (73%) urologists chose ultrasound screening and 3 (27%) chose IVP for UUT surveillance. For LUT surveillance, 55% (6/11) used cystometry, 45% (5/11) cystometry with image diagnosis, and none videourodynamics. For initial treatment of DSD, 73% (8/11) chose CIC with/without anticholinergic agent(s) and 18% (2/11) chose α-blocker(s). For initial treatment of bladder overactivity, 63% (711) chose anticholinergic agent(s) and 18% (2/11) anticholinergic agent(s) with CIC. For initial treatment of areflexic bladder, 64% (7/11) chose CIC, 18% (2/11) Credé method or tapping, and 18% (2/22) indwelling catheter.

Discussion

Prognosis of SCI patients is closely related to complications as well as injury area and severity of the spinal cord. In SCI, LUT dysfunction (LUTD) necessarily occurs. Thus, periodic surveillance is mandatory to detect complications associated with LUTD early and adequate treatment of the complication is also required. Progress in management and surveillance of SCI patients has resulted in prolongation of the patient's life. However, urologic complications still remain to be resolved.[5,6] Recently the results of questionnaires on the current practice patterns in urologic surveillance and management of SCI patients were published in the US and UK.[3,4] The present questionnaire survey was carried out, based on a Japanese version of the surveillance carried out in the US. The questionnaire in the UK study dealt only with the frequency of surveillance in SCI patients and the survey was performed for SCI unit, not urologist. Consequently, the results of our survey were discussed in a comparative manner with the report of Razdan *et al*[3] (Table 4). In the questionnaires, first choice was selected in Japan, whereas multiple choice was chosen in the US. The difference in the method of answering should be taken into consideration in a comparison between the US and Japan.

Table 4 Comparison among three countries in urological management of patients with spinal cord injury (SCI)

Managements/country	*US (by Razdan et al[a])*	*UK (by Bycroft et al[b])*	*Japan (present report)*
Responders	160 Urologists	12 SCI units	333 Urologists
Surveillance			
Interval			
Every 6 months	None	1 (8%)	None
Every year	160 (100%)	7 (58%)	154 (46%)
>Every year	None	2 (17%)	168 (50%)
Only required	None	2 (17%)	11 (4%)
UUT[c]	Multiple choice		First choice
Ultrasound	128 (80%)	NA	239 (72%)
IVP*	8 (5%)	NA	86 (26%)
Scintigraphy	32 (20%)	NA	1 (0.3%)
CT*	8 (5%)	NA	4 (1.2%)
Blood test (creatinine)	149 (93%)	NA	3 (0.9%)
LUT[d]	Multiple choice		First choice
Cystometry	None	NA	174 (52%)
Videourodynamics	104 (65%)	NA	33 (10%)
Cystometry + image diagnosis	None	NA	91 (27%)
Cystoscopy	40 (25%)	NA	22 (7%) as a choice
Not routinely	56 (35%)	NA	25 (8%)
Treatment (first choice except DSD[e])			
Neurogenic bladder overactivity			
CIC[f] with antichol[g]	134 (84%)	NA	63 (19%)
Antichol[g] only	NA	NA	245 (75%)
Areflexic bladder			
CIC alone	144 (90%)	NA	233 (76%)
DSD (as a choice)			
External sphincterotomy**	112 (70%)	NA	176 (54%)

[a]Reference Razdan *et al*[3]
[b]Reference Bycroft *et al*[4]
[c]Multiple choice in the US and first choice in Japan
[d]As routine examinations
[e]Detrusor–sphincter dyssynergia
[f]Clean intermittent catheterization
[g]Anticholinergic agent(s)
*IVP + CT in the US
**Not a main treatment
NA = not available

Concerning the periodic evaluation of the UUT, 85% of the respondents perform ultrasound examination every year in the US, while in Japan, 71.8% of doctors utilize ultrasound as a first-choice approach. As for renal scintigraphy, there was a far greater difference between Japan and the US. This indicated that renal scintigraphy was only rarely used in Japan. Renal scintigraphy cannot be performed in a small-sized hospital without proper equipment and it is more troublesome to apply scintigraphy than ultrasound; for example, it is necessary to ask a radiologist to help. This may be why renal scintigraphy is little used in Japan. In contrast, IVP is frequently utilized by 25.8% of the responders in Japan and the percentage of IVP-using doctors is no more than 5 including CT scan users in the US (Table 4). This suggests that IVP is very familiar and is still highly relied on among Japanese physicians as an approach for UTT surveillance. This is not only the case with the respondents in practice for no less than 16 years, but is also the case with the responders in practice of no more than 10 years. Approximately one-fourth of the respondents who graduated 10 or fewer years before chose IVP as an initial examination of UUT surveillance.

The respondents selecting ultrasound as a first-choice approach make it a rule to indicate IVP and CT scan in cases of urolithiasis, hematuria, sepsis due to urinary tract infection, and others. This is similar to the US result. Many Japanese respondents also chose IVP or CT scan when space-occupying lesions, hydronephrosis, renal deformity, and renal atrophy were found by ultrasound. This suggests that ultrasound has been well used as a diagnostic approach in Japan, although IVP is still frequently used by one-fourth of the physicians who treat SCI patients.

As to the evaluation of LUT, 65% of respondents performed videourodynamic examination in the US,

whereas only 9.9% of respondents in Japan did the examination. The videourodynamic system may be generally considered a device for experimental purposes, not practical ones, in Japan. More than half the Japanese respondents (52.3%) use cystometry alone and 27.3% of respondents added image diagnosis to cystometry. Most urologists in Japan may think that cystometry is enough to evaluate vesicourethral function. No periodical examination for LUT functions was done by 7.5% of respondents in Japan. In the US, 35% of respondents examined them only when patients had repeated UTI or when an abnormality was found on the renal scintigram or ultrasonogram.

In the US, 25% of the respondents periodically performed cystoscopy. In Japan, the percentage of doctors performing periodic cystoscopy was 6.6. Reasons for the discrepancy are not well known. Most Japanese urologists may think it difficult and/or troublesome to perform cystoscopy because of functional disorders of the bladder and disability of the patients. Most urologists in Japan have to treat a lot of outpatients in their clinics without any help of other staff. They may think that ultrasound is easy to do and is sufficient to observe bladder of the patient. On the contrary, when hematuria or a bladder stone was found or when recurrent UTI was present, cystoscopy was very commonly indicated in both Japan and the US. Approximately one-third of Japanese respondents have experienced bladder tumor(s) in patients with SCI. This number is significant, although the number of patients with an indwelling catheter is small nowadays in Japan.[7] It seems necessary to perform urinary cytological examination periodically in all SCI patients and 76% of the respondents employed the method in Japan. Data on bladder cancer in the US are not available, because questions on bladder cancer were added in the questionnaire of the Japanese version.

For the treatment of neurogenic bladder overactivity, a combination of anticholinergic agent(s) with CIC was indicated as a common modality by 84% of the respondents in the US. In Japan, anticholinergic agent(s) were often used alone as a first-choice treatment (74.7%). Only 19.2% of Japanese respondents indicated anticholinergic agent(s) and CIC in combination as a first-choice treatment, although 53% chose the combination treatment as a second choice. CIC as an initial treatment after a stage of spinal shock seems to be less commonly used in Japan than in the US. In general, Japanese urologists as well as patients prefer patient's self-voiding without any devices and try medication as much as possible after the spinal shock period because they may think that CIC deteriorates QOL of the patients. The aforementioned tendency in Japan can be seen in the treatment for detrusor areflexia and DSD. For detrusor hyporeflexia or areflexia, CIC is indicated by 90% of the respondents in the US as a common treatment, while 73.7% doctors indicated CIC in Japan and 19.8% of Japanese chose the Credé maneuver or tapping.

For DSD, 70% of respondents considered sphincterotomy in the US, while a half of Japanese responders indicated surgical procedure including radical TUR-P.[8] Very few Japanese urologists (0.3%) chose the surgery as a first-choice approach. In Japan, α-blocker[9] was indicated as a first-choice therapy (69.2%).

In the US, 20% of the respondents have been in practice for 5 years or less, 45% for 6–10 years, 10% for 11–16 years, and 25% for 16 years or longer. This means that a majority of the respondents have been in practice for 10 years or less. In the present study, 70.1% of respondents in Japan have practiced for more than 15 years. It is likely that, in Japan, older doctors more often treat SCI patients than younger doctors or that young doctors did not answer our questions, believing that their experience was not sufficient for answering the questions.

It seems that the difference in the number of years in practice may be a cause of differences between the US and Japan with regard to approaches for examinations and treatments. However, there was no significant difference in management of SCI patients between urologists in practice for 16 years or longer and those with less than 16 years, in the present study in Japan. The situational difference among institutes or hospitals may also be a determinant factor of such an intercountry difference.[4] In Japan, SCI patients are treated at various kinds of institutes because there is only one SCI center. In the past, labor accident hospitals founded by the Ministry of Labor gathered SCI patients to some extent. At present, the hospitals are operated as general hospitals because of the decrease in labor accidents and are not centers for SCI people any more.

The number of SCI patients treated by one doctor per year varies from more than 500 to a few. Most of the respondents treated no more than 10 SCI patients in general or university hospitals. It is difficult to explain the circumstances. Unlike patients with cancer, most Japanese SCI patients may prefer easy access to a hospital in a neighboring area rather than waiting for a long time in a hospital with a SCI specialist, or sufficient information may not have been given to the patients.

In conclusion, through the present survey by questionnaire, the variety of diagnostic and therapeutic approaches and the tendency of Japanese physicians' preference have been shown. Some of them may be controversial. Our study also demonstrates that there are some differences in management of SCI patients by urologists between Japan and the US. One of the shocking facts is that many urologists treat just a few SCI patients per year. This means that a few Japanese urologists who treat SCI patients may not have enough experience in the management of SCI patients. As is often the case with major cancer surgeries,[10] threshold volume (number of patients) seems to be necessary for the treatment of the SCI patients, at least during training. In order to improve the conditions mentioned above, foundation of new SCI centers or units as leading and teaching institutes may be meaningful.

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Appendix A.

A 14-point questionnaire on the management of SCI patients mailed to members of the Japan Neurogenic Bladder Society.

Q1. Select the first-priority diagnostic approach that you most commonly perform for the current diagnosis of the upper urinary tracts (Please choose one answer).
1. Ultrasound.
2. IVP (Excretory urography).
3. Renal scintigraphy.
4. CT scan.
5. Others (note:).

Q2. When ultrasound is selected in Q1, mark the indication(s) of CT scan.
1. Urolithiasis.
2. Urosepsis (severe UTI).
3. Hematuria.
4. Others (note:).

Q3. When ultrasound is selected in Q1, check the indication(s) of IVP.
1. Urolithiasis.
2. Urosepsis (Severe UTI).
3. Hematuria.
4. Others (note:).

Q4. What surveillance do you perform for the evaluation of cysto-urethral functions? Please choose one answer.
1. CMG (Cystometry).
2. Videourodynamics.
3. CMG and Image diagnosis.
4. No surveillance performs for cysto-urethral function evaluation.
5. Others (note:).

Q5. Check the indication(s) of cystoscopy.
1. Hematuria.
2. Bladder stone.
3. All patients with neuropathic bladder.
4. Others (note:).

Q6. Do you every-year perform one, or more, of the above urinary tract surveillances?
1. Yes.
2. Not yearly.
3. In spite of the intention to do it yearly, it cannot be done actually.
4. Others (note:).

Q7. Check diagnostic approach(es) for bladder tumor.
1. Cytoscopy.
2. Urinary cytology.
3. Ultrasound.
4. Others (note:).

Q8. Have you ever experienced any patients with bladder tumor?
1. Have experienced ( ) cases.
2. Not yet.

Q9. Treatment of DSD (Detrusor Sphincter Dyssynergia). Choose one or more in order of priority.
1. α-blocker.
2. CIC (Clean Intermittent Catherization) with/without anticholinergic agent(s).
3. External urethral sphincterotomy.
4. Urethral stent placement.
5. Indwelling catheter.
6. Others (note:).

Q10. Treatment of over-active bladder (OAB). Choose one or more in order of priority.
1. Anticholinergic agent(s).
2. CIC alone.
3. Anticholinergic agent(s) and CIC.
4. Others (note:).

Q11. Treatment of areflexic bladder. Choose one or more in order of priority.
1. CIC.
2. Credé method or tapping.
3. Indwelling catheter.
4. Others (note:).

Q12. Number of years since your graduation from medical school.

Q13. Number of SCI patients: ( ) cases per year. If you cannot give a reliable number, check one of the below-given answers.

1. $<$ or $=10$ cases.
2. $<$ or $=50$ cases (and >10 cases).
3. $<$ or $=100$ cases (and >50 cases),
4. $<$ or $=500$ cases (and >100 cases).
5. >500 cases.

Q14. Type of your institute.

1. Private office.
2. General hospital.
3. University hospital.
4. Labor accident hospital.
5. Rehabilitation hospital.
6. Others (note:).

Extra-Q. Note your name and your institute (if you do not mind).