Current Trend of Treatment for Incidental Durotomy in Lumbar Spine Surgery in Thailand: National Survey

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ABSTRACT

Objective: To determine current decision making in treatment for incidental durotomy (ID) in Thailand.
Methods: A questionnaire was sent to all orthopedic surgeons who attended the annual meeting of the Spine Society of Thailand 2016. The questionnaire had 2 parts including demographic data and 15 questions about details of ID repairing technique and postoperative treatment.
Results: Sixty-seven responses were received from 213 participants (31.45% response rate). All respondents were male and performed lumbar spine surgery. Twenty-seven (40.30%) respondents work in a regional hospital. When ID occurred, most of the respondents (87.93%) provided further treatment. Sixty-one percent of respondents preferred prolene. Nylon and silk were used in 20% and 15%, respectively. The preferred size of repairing material was 6-0 (52.23%) and 5-0 (28.36%). The interrupted suture was used in 68.65 percent (46/67). The augmentation included fat graft (29/58, 50%), fibrin glue (12/58, 20.69%) and spongiostan (9/58, 15.5%). Seventy-five percent of respondents (48/64) used vacuum drain and 80% of respondents (54/67) prescribed bed rest after every dural repair. The durations of bed rest were 24 hrs (14/66, 21.2%), 48 hrs (27/66, 40.9%), 72 hrs (16/66, 24.2%) and more than 72 hrs (9/66, 13.6%).
Conclusion: The perioperative management of lumbar ID in Thailand has substantial heterogeneity. Most of the participants prefer using interrupted suture, prolene, 6-0 in diameter, fat graft augmentation and placing wound drainage with vacuum. Duration of best rest varied between 24 to more than 72 hours.

Keywords: Incidental durotomy, accidental durotomy, lumbar spine, Thailand, survey

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INTRODUCTION

The incidental or accidental durotomy (ID) is one of the common intraoperative complications in spine surgery. The prevalence of ID ranged between 2.9-11.3%[1-10] depended on age[11], level of surgery[10], gender[12], type of surgery[12-13] and revision surgery[7]. The sequelae of ID include dizziness, vomiting, headache[14], intracranial hemorrhage[15], symptomatic pneumorachis[16], intracranial hypotension and reversible cerebral vasospasm[17]. Additionally, ID cases significantly increase hospital length of stay and overall cost of treatment[10].

The treatment of choice is direct repair combined with various types of sealant. Unfortunately, there are many repairing techniques and postoperative care protocols in lumbar ID. In the year 2014, Gautschi et al performed the online

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survey in members of the Swiss, German, and Austrian neurosurgical and spine societies. The results showed that there was heterogeneity in the management. Nineteen percent of responders recommend only bed rest while most of them suggested direct repair combined with various bed rest periods[18]. Clajus et al conducted neurosurgical departments' survey about lumbar IC management in Germany. Sixty-five percent of respondents treat IC by a combination of methods while 25.7% did suture alone. There were 72.5% prescribed bed rest for 1-3 days[19].

To our knowledge, there has been no survey in Thailand about lumbar ID management. The purpose of the present study was to assess the current trend of intraoperative and postoperative lumbar ID management among Thai orthopedic surgeons who attended the annual meeting of Spine society of Thailand 2016.

MATERIALS AND METHODS

For data comparison, we adapted the questionnaire of the Gautschi et al study[18]. The questionnaire in the present study had two parts. The first part had demographic questions that pertained to gender, age and type of hospital. The second part had 15 questions including an annual number of lumbar surgery cases, the percentage of ID occurrence, treatment, details of suturing material, augmentation, details of lumbar drain use, details of postoperative bed rest and management of persistent cerebrospinal fluid (CSF) leakage. The questionnaire was shown in Table 1.

The questionnaire was distributed to orthopedic surgeons who attended the annual meeting of the Spine Society of Thailand 2016. Inclusion criteria was Thai board-certified orthopedic surgeon. Descriptive statistics analysis were used for this survey. The percentage of answers was calculated separately and depended on a number of respondents of each question. Statistical testing was performed using SPSS18 (SPSS Inc, Chicago, IL).

RESULTS

Responses were received from 67 surgeons from 213 participants (31.45 % response rate). All respondents were male with average 41.72 ± 9.89 years (range 27-75 years) and performed lumbar spine surgery. Sixty percent of respondents had age less than 45 years old. Twenty-seven (40.30%) respondents work in a regional hospital, while 19 (28.36%), 14 (20.89%) and 7 (10.45%) work in community/provincial hospitals, university hospitals and private hospitals, respectively. Ninety percent of respondents (55/61) performed lumbar spine surgery less than 100 cases per year. The demographic data are shown in Table 2.

The percentage of ID which occurred less than 1%, 1-3% and more than 3% of cases were 24/61 (39.34%), 28/61 (45.90%) and 6/61 (14.75%), respectively. When ID occurred, most of the respondents (51/58, 87.93%) had further treatment and 10.34 % (6/58) ordered only bed rest. Only one respondent answered do nothing.

About surgical technique, 61 percent of respondents (37/60) preferred prolene. Nylon and silk were used in 20% (12/60) and 15% (9/60), respectively. The preferred size of repairing material were 6-0 (35/67, 52.23%), 5-0 (19/67, 28.36%), 4-0 (12/67, 17.91%) and 3-0 (1/67, 1.49%). The interrupted suture was used in 68.65 percent (46/67). The additional augmentation were fat graft (29/58, 50%), fibrin glue (12/58, 20.69%) and spongiostan (9/58, 15.5%). After dural repair, 49 respondents (49/65, 75.4%) placed lumbar drain and sub fascial space was the most common site (52/63, 82.54%). In addition, 75 percent of respondents (48/64) used vacuum drain.

In terms of bed rest, 80 percent of respondents (54/67) prescribed bed rest after every dural repair but five percent (3/67) answered never use. About 15 percent (10/67) used bedrest when the inadequate dural repair was performed. The durations of bed rest were 24 hrs (14/66, 21.2%), 48 hrs (27/66, 40.9%), 72 hrs (16/66, 24.2%) and more than 72 hrs (9/66, 13.6%). Concerning persistent CSF leakage after repairing, 36 percent of respondents (24/64) answered wait and see. There was 27 percent (18/64) preferred re-operation. Most of the respondents (52/66, 78.8%) always informed their patients that had ID after the operation. Interestingly, two respondents (2/66, 3.0%) never informed about ID. The details of ID repairing techniques were shown in Table 3.

DISCUSSION

The incidental or accidental durotomy (ID) is not an uncommon complication in lumbar spine surgery. Usually the treatment of choice is direct repair with or without augmentation. The previous survey in many countries showed a variety of repairing techniques and perioperative protocol especially augmentation and bed rest[18]. Unfortunately, there was no data about the current intraoperative and postoperative lumbar ID management among Thai orthopedic surgeons. To our knowledge, this present study was the first survey about lumbar ID management in Thailand.

The results of the present study showed most of the respondents (45.90%) reported ID prevalence about 1-3% of their lumbar surgery. About 88% percent had further treatment when ID occurred. Prolene was the most common suture (61%) and 6-0 was the most common diameter

TABLE 1. Show details of survey questionnaire

Current Trend of Treatment for Incidental Durotomy in Lumbar Spine Surgery in Thailand: National Survey	code_____
Please select only one answer and check ☑ for each questions	
Demographic data	
Gender □ Male □ Female Age__ year	
Type of hospital □ community hospital □ General Hospital □ Regional hospital □ University hospital □ Private hospital □ Other _____	
Do you ever perform lumbar surgery before? □ Yes □ Never	
Details of dural repair and postoperative treatment	
Please select only one answer for each questions and check ☑ in right-side column	
(You can check many answers in the questions that had * mark)	
1. How many lumbar surgery case do you perform annually?	□ 0-49 □ 50-99 □ 100-200 □ >200
2. How many percent do you have ID?	□ 0% □ <1 % □ 1-3 % □ 3-6 % □ 6-9 % □ >9 %
3. What is your treatment when ID occur?	□ do nothing □ only bed rest (please stop if answer these two answers) □ further treatment (please answer question No 4-15 and you can check multiple answers in questions that had *)
4. Suture material	□ Nylon □ prolene □ silk □ vicryl □ other_____
5. Size of suture material	□ 3-0 □ 4-0 □ 5-0 □ 6-0 □ other_____
6. Suturing techniques	□ interrupted □ running □ other_____
7. Augmentation*	□ fibrin glue □ fat graft □ muscle graft □ spongiostan □ other_____
8. Do you use lumbar drain in lumbar surgery?	□ Never □ Sometimes □ Always use □ Other_____
9. Do you use lumbar drain after ID repair?	□ Never (please skip to question No 12) □ Sometimes □ Always use (please answer question No. 10,11)
10. Where do you put the drain?	□ subfascial □ subcutaneous □ both
11. Do you use the vacuum?	□ No □ Yes
12. Do you order the bed rest treatment to patients?	□ Never □ yes only if inadequate repairing □ Always
13. If answer in question No12 is yes, how long?	□ 24 Hrs □ 48 Hrs □ 72 Hrs □ >72 Hrs
14. How do you manage persistent CSF leakage after repairing?*	□ wait and see □ IV fluid □ relative bed rest □ strict bed rest □ repeat MRI □ reoperation □ other_____
15. Do you inform patients if ID occur?	□ never □ sometimes □ always

TABLE 2. Show demographic data of respondents

Question	Answer	Number (percent)
Gender	Male	67 (100)
Age	< 45 years old	37 (60.7)
	> 45 years old	24 (39.3)
Type of hospital	Community/General	19 (28.36)
	Regional	27 (40.30)
	University	14 (20.89)
	Private	7 (10.45)
Do you ever perform lumbar surgery before?	Yes	67 (100)
How many lumbar surgery case do you perform annually?	0-49	40 (65.56)
	50-99	15 (24.58)
	100-200	4 (6.58)
	> 200	2 (3.28)
How many percent of lumbar spine surgery do you have ID?	0%	2 (3.28)
	< 1%	22 (36.06)
	1-3%	28 (45.90)
	3-6%	6 (9.84)
	6-9%	2 (3.28)
	> 9%	1 (1.64)

(52.23%). Sixty-eight percent of respondents used interrupted suture. Additionally, fat graft and fibrin glue were the preferred augmentations. Ins term of postoperative care, eighty percent of respondents prescribed bed rest after dural repair. The durations of bed rest were 24 hrs (21.2%), 48 hrs (40.9%), 72 hrs (24.2%) and more than 72 hrs (13.6%). In addition, nearly 79 percent always informed their patients after ID happen.

Gautschi et al performed the online survey in members of the Swiss, German, and Austrian neurosurgical and spine societies. Ninety percent of respondents were neurosurgeon and 84% had further treatment while 19.4% prescribed only bed rest. The most common suture technique and augmentation were interrupted suture and spongiostan, respectively. About seventy percent prescribed postoperative bed rest (34.9% 24 hrs, 28% 48 hrs, and 6.3% 72 hrs). Eighty-two percent always informed their patients if ID occured[18]. Clajus et al sent a questionnaire to the chief of the neurosurgical departments in Germany about lumbar ID management. Sixty-five percent of respondents treated ID by a combination of methods while 25.7% suture alone, 6.4% fibrin-coated fleeces alone, 1.8% muscle patch alone and 0.9% with fibrin glue alone. About postoperative bed rest, there were 72.5% prescribed bed rest for 1-3 days, 1.8% > 3 days, and 25.7% allowed immediate mobilization without bed rest[19].

Comparing with Gautschi et al study, the results of our study was similar in term of percentage of further treatment, suturing techniques, postoperative bed rest and patient inform. However, the most common augmentation in the presented study was fat graft and fibrin glue while the other study was spongiostan[18]. Furthermore, most of our respondent (75.4%) used postoperative wound drainage, but only one-third in Gautschi et al respondents used it. There were many different results when compared with Claus et al study. Sixty-five percent of their respondents preferred combination of at least two types of augmentation and one fourth used only suture. However, 72 percent prescribed bed rest between 1-3 days while 86 percent of our respondent also did the same.

The limitations of this study were small size of the sample, low response rate, and only orthopedist. However, the results of this present study showed the current trend of Thai orthopedic surgeon about ID repairing techniques and postoperative care protocol which was similar

TABLE 3. Show intraoperative and postoperative data of present study comparing previous studies

Question	Answer	Number (percent)		
		Present study (2016)	**Clajus et al (2015)**	**Gautschi et al (2014)**
Country		Thailand	German	Swiss, German, and Austrian
Response rate		67/213 (31.45)	109/149 (73.2)	175/397 (44.1)
Respondents type		Orthopedist (100)	Neurosurgeon (100)	Neurosurgeon (89.7) Orthopedist (10.3)
What is your ID treatment?	Do nothing	1 (1.73)	N/A	17 (9.7)
	Only bed rest	6 (10.34)	N/A	34 (19.4)
	Further treatment	51 (87.93)	N/A	147 (84.0)
Suture material	Nylon	12 (20.00)	N/A	N/A
	Prolene	37 (61.67)	N/A	N/A
	Silk	9 (15.00)	N/A	N/A
	Vicryl	2 (3.33)	N/A	N/A
Size of suture material	3-0	1 (1.49)	N/A	N/A
	4-0	12 (17.91)	N/A	N/A
	5-0	19 (28.36)	N/A	N/A
	6-0	35 (52.23)	N/A	N/A
Suturing techniques	Interrupted	46 (68.65)	N/A	122 (69.7)
	Running	21 (30.9)	N/A	47 (26.9)
Augmentation	Fibrin glue	12 (20.7)	1 (0.9)	54 (30.9)
	Fat graft	29 (50.0)	2 (1.8)*	23 (13.1)
	Muscle graft	2 (3.4)		36 (20.6)
	Spongiostan	9 (15.5)		139 (79.4)
	Other	6 (10.3)	109 (65.1) †, 28(25.7) ‡	N/A
Do you use lumbar drain in lumbar surgery?	Never	17 (25.4)	N/A	0
	Sometimes	13 (19.4)	N/A	66 (37.7)
	Always use	37 (55.2)	N/A	6 (3.4)
Do you use wound drainage after ID repair?	Never	4 (6.2)	N/A	65 (37.1)
	Sometimes	12 (18.5)	N/A	54 (30.9)
	Always use	49 (75.4)	N/A	59 (33.7)
Where do you put the drain?	Sub fascial	52 (82.5)	N/A	N/A
	Subcutaneous	5 (7.9)	N/A	N/A
	Both	6 (9.5)	N/A	N/A
Do you use the vacuum?	No	16 (25.0)	N/A	N/A
	Yes	48 (75.0)	N/A	N/A
Do you order the bed rest treatment to patients?	Never	3 (5.5)	19/66 (28.8)	26 (14.9)
	Yes if inadequate	10 (14.9)	47/66 (71.2) §	22 (12.6)
	Always	54 (80.6)		121 (69.14)
How long do you use bed rest?	24 Hrs	14 (21.2)	79/109 (72.5) ||	61 (34.9)
	48 Hrs	27 (40.9)		49 (28.0)
	72 Hrs	16 (24.2)		11 (6.3)
	>72 Hrs	9 (13.6)	2/109 (1.8)	0 (0)
Do you inform patients if ID occur?	Never	2 (3.0)	N/A	2 (1.1)
	Sometimes	12 (18.2)	N/A	28 (16.0)
	Always	52 (78.8)	N/A	145 (2.9)

*muscle/fat graft, †combined augmentation, ‡ suture alone, § use bed rest, || 24-72 hrs

from the previous studies that were conducted in European neurosurgeons. Moreover, these results may guide the spine surgeon to select the proper treatment for ID after lumbar surgery.

CONCLUSION

In Thailand, the perioperative management of lumbar ID has substantial heterogeneity the same as previous surveys in Europe. Most of the participants prefer using interrupted suture, prolene, 6-0 in diameter, fat graft augmentation and sub facial wound drainage with a vacuum. Unfortunately, duration of postoperative best rest had a variety which ranged between 24 to more than 72 hours. Because of lacking good evidence-based guideline, the prospective multicenter randomized controlled trial is warranted.

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Potential conflicts of interest
None

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