

Original article

Factors affecting long-term psychosocial outcomes after hypospadias repair

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Background: Hypospadias is one of the most common congenital genital malformations. Despite current progress in surgical techniques, long-term psychosocial outcomes received little attention.

Objective: To evaluate long-term psychosocial outcomes after hypospadias repair and analyze the root causes regarding satisfactory outcomes.

Methods: Patients who underwent hypospadias repair during childhood period were recruited. Regarding psychosocial outcomes, the patients were invited for evaluation by the questionnaires in Thai version form. Data were analyzed by STATA program. Univariate analysis and multiple linear regression were used for statistical analysis.

Results: There were 38 hypospadias patients, median age = 14 years (range 11 - 27) recruited into the study. The patients underwent first hypospadias repair at the median of 3.5 years old (range 1 - 14). The types of hypospadias were namely: glandular type (1/38), corona type (5/38), midshaft type (10/38), and penoscrotal type (22/38). The overall average score of satisfactory psychosocial outcomes was 25.3 ± 5.9 (range 14 - 37, maximal score = 39). Using simple linear regression analysis, factors affecting psychosocial outcomes ($P < 0.05$), were older age at first hypospadias surgery, mild type of hypospadias, technique of hypospadias repair, current urethro-cutaneous fistula, conduct problems, and abnormal peer difficulty problems. When applying multiple linear regression analysis, only 3 factors were significantly associated with psychosocial outcomes: severe type of hypospadias when compared with corona and mid-shaft type ($Coef. = 7.94$ and 5.16 , $P = 0.001$ and 0.005 , respectively), current urethro-cutaneous fistula ($Coef. = -4.38$, $P = 0.02$) and high peer difficulty problems, ($Coef. = -5.88$, $P = 0.04$).

Conclusion: Factors which affected long-term decreasing psychosocial satisfactory outcomes were penoscrotal hypospadias, current urethro-cutaneous fistula, and high peer difficulty problems.

Keywords: Hypospadias, long term, psychosocial, outcome, urethro-cutaneous fistula.

Hypospadias is one of the most common congenital genital malformations. Despite current progress in surgical techniques following hypospadias repair, their long-term psychosocial outcomes received little attention.

Many previous publications regarding the functional and cosmetic outcome of hypospadias

repair are represented.^(1, 2) Previous several studies have demonstrated a negative subjective appearance in patients.^(3, 4) The difference was observed regarding hiding the penis from peers.^(5 - 7) Some publications suggest that psychosexual function and quality of life may be impaired in patients with distal hypospadias.^(5, 8) The attitude of the parents to the genital appearance of their child may also possibly influence patient genital perception and development.⁽⁹⁾

Therefore, psychosocial outcome after hypospadias repair and self-esteem may indicate quality of life of the patients. There are instruments available to assess psychosocial development and genital perception outcome. Usually general

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psychological questionnaires Are used in studies.⁽¹⁰⁾ Some studies used the standardized the Strength and Difficulties Questionnaire (SDQ) to evaluate the baseline behavioral screening.⁽¹¹⁾

Weber DM, *et al.*⁽⁸⁾ reported the Pediatric Penile Perception Score that is a reliable instrument to assess penile self-perception in children after hypospadias repair. Ardelt PU, *et al.*⁽¹¹⁾ developed the satisfaction in genital hypospadias treatment (SIGHT) satisfaction score represented that the high SIGHT score is, as well as the favorable functional and cosmetic outcome.

Materials and methods

This study has been approved by Institutional Review Board (IRB) of the Faculty of Medicine, Chulalongkorn University (certificate of approval no. 546/63). All patients who presented with congenital hypospadias and underwent hypospadias repair at King Chulalongkorn Memorial Hospital since 2001 (current age between 11 and 30 years of age) were recruited.

Then they had to pass the exclusion criteria. (patients who cannot read/understand Thai language or have a mental retardation, global delayed development, disabled blind or follow-up is impossible).

Regarding psychosocial outcomes, the patients were invited for evaluation by the modified SIGHT questionnaire (developed by previous German publication in pediatric urology) and the Strength and Difficulty questionnaire in Thai version form and performed physical examination if needed. A written consent was given by all subjects and their parents. The demographic data of patients were collected. Data were analyzed by STATA program and were expressed as mean $\pm$ standard deviation (SD). Univariate analysis and multiple linear regression were used for statistical analysis.

All of congenital hypospadias patients who underwent hypospadias repair at the institute (current age 11 - 30 years of age) were 57 cases. There are 19 cases who were excluded from this study (Two cases cannot read or understand Thai language, 2 cases have global delayed development, 2 cases are dead, and 13 cases are loss to follow-up). Thus, the total subjects were 38 cases (Table 1, 2).

This is all of satisfactory psychosocial scores. The scores consist of functional and cosmetic outcomes. The average score of satisfactory score was 25.3 ± 5.9 (minimal score 14/39, maximum score 37/39) (Table 3).

Most subjects are in normal range of difficulty score. Except in peer problems score, subjects are in borderline group 44.0%, and 7.8% in abnormal group.

Some of hypospadias subjects were presented with abnormal SDQ score: emotional symptoms 2/38 (5.3%), conduct problem 2/38 (5.3%), hyperactivity problems 3/38 (7.9%), peer problems 3/38 (7.9%), prosocial problems 1/38 (2.6%) and total difficulty problems 2/38 (5.3%)(Table 4).

As a result of univariate analysis (Table 5).

The statistically significant factors associated with satisfactory outcomes were namely: Age at first hypospadias ($P = 0.02$) (95% CI 0.10, 1.18), type of hypospadias, especially mild type of hypospadias (when compared with severe/penoscrotal type) ($P = 0.0008$) (95% CI - 3.89, - 0.42), technique of hypospadias repair esp. when MAGPI technique was compared with scrotal flap technique ($P = 0.01$) (95% CI - 3.85, - 0.09), current presentation of urethro-cutaneous fistula ($P = 0.006$) (95% CI -10.68, - 2.66), conduct problems ($P = 0.01$) (95% CI - 7.43, - 0.85), and abnormal peer difficulty problems ($P = 0.02$) (95% CI -15.45, - 1.32).

Results

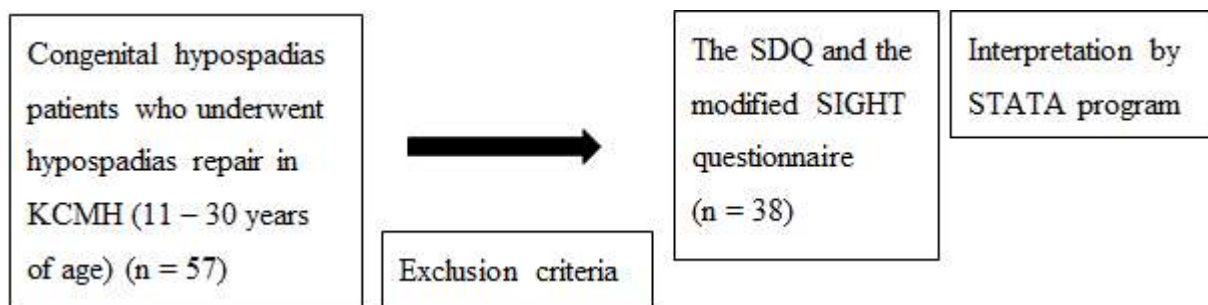


Figure 1. Study flow chart (KCMH: King Chulalongkorn Memorial Hospital, SDQ: Strength and Difficulty questionnaire, SIGHT: satisfaction in genital hypospadias treatment)

Table 1. Patient's characteristics.

Patient's characteristics	N	Percentage	Mean	SD	Min	Max
Current age (year)	38	100.0	14.7	3.3	11	27
Age at first hypospadias repair (year)	38	100.0	4.8	3.4	1	14
Number of major gonadal operation	38	100.0	2.9	1.4	1	6

Table 2. Patient's characteristics.

Patient's characteristics	N	Percentage
Type		
Glandular	1/38	2.6
Corona	5/38	13.2
Midshaft	10/38	26.3
penoscrotal	22/38	57.9
Technique-		
MAGPI	6/36	16.7
Mathieu	3/36	8.3
Scrotal flap	18/36	50.0
2 - staged	7/36	19.4
TIP Snodgrass	2/36	5.6
Need for re-operation	30/38	79.0
History of surgical site infection	10/38	26.3
History of urethro-cutaneous fistula	29/38	76.3
Current urethro-cutaneous fistula	9/38	23.7

Table 3. Psychosocial satisfaction of hypospadias patients measured by the modified SIGHT questionnaire.

Statements	Mean	SD	Min	Max
I am satisfied with the surgical result.	2.4	0.6	1	3
I am satisfied with the function of my penis.	2.3	0.6	1	3
I am satisfied with the erection of my penis.	2.2	0.6	1	3
I am satisfied with the appearance of my penis.	2.2	0.6	1	3
I am satisfied with the length of my penis.	1.9	0.6	0	3
I am satisfied with the size of my penis.	2.0	0.6	1	3
I am satisfied with the appearance and location of my meatus.	2.3	0.6	1	3
I am satisfied with the appearance of my prepuce.	2.2	0.5	1	3
I consider my penis normal.	1.9	0.6	1	3
I feel restricted in my masculinity.	1.7	0.9	0	3
I hide my penis in the public.	1.2	0.9	0	3
I fear to be teased because of my penis.	1.4	0.9	0	3
I feel restricted in my sexuality.	1.6	0.9	0	3
Total satisfactory score	25.3	5.9	14/39	37/39

Table 4. Distribution of the strength and difficulties questionnaire (SDQ) score of patients.

SDQ	Normal (%)	Borderline (%)	Abnormal (%)
Emotional symptoms	92.1	2.6	5.3
Conduct problems	79.0	15.8	5.3
Hyperactivity problems	92.1	0.0	7.9
Peer problems	47.4	44.7	7.9
Prosocial	60.5	36.8	2.6
Total difficulty score	81.6	13.2	5.3

Table 5. Univariate analysis of factors associated with psychosocial satisfactory score.

Variable	Coefficient	P - value	95% CI	Adj R-squared
Current age	0.26	0.35	-0.31, 0.85	-0.003
Age at first hypospadias repair	0.64	0.021	0.10, 1.18	0.11
Number of major gonadal operation	-0.49	0.46	-1.85, 0.85	-0.01
Type of hypospadias	-	0.0008	-5.75, -1.64	
Glandular vs Penoscrotal	3.54	0.48	-6.63, 13.72	
Corona vs Penoscrotal	8.54	0.001	3.61, 13.47	
Midshaft vs Penoscrotal	6.24	0.002	2.44, 10.04	
Penoscrotal	-	-	-	0.30
Technique	-	0.01	-3.89, -0.42	
MAGPI vs Scrotal flap	5.33	0.05	0.0006, 10.66	
Mathieu vs Scrotal flap	6.16	0.08	-0.88, 13.22	
2-staged vs Scrotal flap	-1.92	0.44	-6.96, 3.11	
TIP Snodgrass vs Scrotal flap	0.5	0.90	7.93, 8.93	
Scrotal flap	-	-	-	0.12
Need for re-op	-1.97	0.40	-6.72, 2.77	-0.007
Hx of SSI	-3.68	0.08	-7.94, 0.57	0.05
Hx of urethro-cutaneous fistula	-0.45	0.84	-5.05, 4.13	-0.02
Current urethro-cutaneous fistula	-6.67	0.002	-10.68, -2.66	0.21
Total difficulty score				
Normal	-	-	-	0.01
Borderline	-3.2	0.26	-8.90, 2.50	
Abnormal	-5.0	0.24	-13.63, 3.63	
Emotional symptoms				
Average	-	-	-	0.01
Raise	6.62	0.27	-5.37, 18.63	
High	-4.14	0.01	-7.43, -0.85	0.13
Conduct problems				
Average	-	-	-	0.01
Raise	-4.8	0.06	-9.82, 0.22	
High	-7.46	0.07	-15.67, 0.74	
Hyperactivity problems	-1.61	0.36	-5.20, 1.96	-0.004
Peer problems				
Average	-	-	-	0.09
Raise	-0.91	-0.63	-4.75, 2.91	
High	-8.38	0.02	-15.45, -1.32	
Prosocial problems				
Average	-	-	-	0.04
Raise	-1.47	0.46	-5.52, 2.57	
High	-7.04	0.24	-19.24, 5.16	
Patient's expectation	0.03	0.98	-4.11, 4.19	-0.03
Parent's expectation	-1.64	0.47	-6.29, 2.99	-0.01
Family impaction	-0.03	0.98	-3.95, 3.88	-0.02

The other factors for example: patient and parent's expectation or family impaction were not statistically significant when compared with satisfactory outcomes. According to the results, older age at first hypospadias repair associated with increased satisfactory outcomes. Same as mild type of hypospadias (compared with severe/penoscrotal type) shows statistic significantly associated with

higher satisfactory outcomes (corona type $P = 0.001$) (midshaft type $P = 0.002$).

Represented conduction problems was associated with lower satisfactory outcomes ($P = 0.01$). However, interpretation of borderline and high abnormal score (compared with normal score) was not associated with satisfactory outcomes ($P = 0.06, 0.07$ respectively).

Table 6. Multiple linear regression of factors associated with psychosocial satisfactory score.

Variables	Coefficient	P-value	95% CI	Adj R-squared
Type of hypospadias				
Glandular vs Penoscrotal	7.23	0.12	- 2.06, 16.52	0.49
Corona vs Penoscrotal	7.94	0.001	3.64, 12.24	
Midshaft vs Penoscrotal	5.16	0.005	1.64, 8.68	
Penoscrotal	-	-	-	
Current urethro-cutaneous fistula	- 4.38	0.02	- 8.24, - 0.51	
Peer problems				
Average	-	-	-	
Raise	- 1.93	0.19	- 4.91, 1.04	
High	- 5.88	0.04	- 11.6, - 0.17	

While as high abnormal score of peer difficulty problems (compared with normal score) was associated with lower satisfactory outcomes ($P=0.02$)

Then pairwise correlation test was used to exclude correlation factors. As a consequence, multivariate linear regression was performed.

The above table shows the strong statistically significant factors associated with satisfactory outcomes as in corona and midshaft type when compared with penoscrotal type of hypospadias, current presentation of urethro-cutaneous fistula and high abnormal peer difficulty problem score. The total adjusted R- squared was 0.49 (Table 6).

Discussion

This study revealed that decreased satisfactory outcomes were associated with younger age at first hypospadias repair while as, Wang WW, *et al.*⁽¹²⁾ reported that increased anxiety and depression was correlated with the age at which surgery was complete. Additionally, penoscrotal or severe type of hypospadias when compared with others was associated with lower satisfactory outcomes.

Except for glandular type which had low incidence of surgery in the institute. Due to current distal hypospadias repair can be performed at most of general hospital in Thailand, thus there is unnecessary reason to refer the patients for distal hypospadias repair in the university hospital. Apart from this, Thai parents prefer non-operative treatment for their children who still have normal urinary function of distal type hypospadias.

Due to surgeon preference, scrotal flap technique is the most popular technique; It is used for hypospadias repair in the institute. Thus, scrotal flap technique and penoscrotal type may be correlation

factors. It is proved with pairwise correlation test which is interpreted that type of hypospadias repair is a confounding factor. Furthermore, current presentation of urethro-cutaneous fistula was also associated with lower satisfactory outcomes.

The study revealed that total difficulty score was not significantly associated with satisfactory outcomes. Likewise, most studies did not observe any significant differences between patients and the general population. Mondaini N, *et al.*⁽³⁾ revealed no significant differences between 42 youths with hypospadias and 500 healthy youths with regard to personality profile (MMPI: Minnesota Multiphasic Personality Inventory). Glaser T.⁽¹³⁾ reported that whereas the 20 hypospadias patients showed a high level of emotional instability, but did not notice any further impairments of psychosocial adjustment.

However, some psychological factors must be considered, for instance: conduct problems and high abnormal peer difficulty problems were associated with decreased satisfactory outcome in this study, many confounding factors cannot be excluded in this study, for example: teenage problems, LGBTQ gender satisfactory outcomes. On the other hand, family impaction and parent or patient's expectation were not associated with satisfactory outcomes.

There are some limitations in this study with respect to the small sample size. According to psychosocial evaluation by the strength difficulty questionnaire, we found that some subjects have serious difficulty problems. And some subjects experienced many difficult problems. We decided to call them back and have re-evaluation at the pediatric psychology clinic. It is in the process because of COVID-19 pandemic situation.

Conclusion

In summary, functional and cosmetic outcomes after hypospadias repair were in satisfactory value. The factors that affected long-term decreasing psychosocial satisfactory outcomes are as follows: penoscrotal hypospadias, current urethro-cutaneous fistula, and high peer difficulty problems. However, further studies are needed to elucidate the causes of long-term psychosocial outcomes after hypospadias repair.

Conflicts of interest statement

Each author has completed an ICMJE disclosure form. None of the authors declare any potential or actual relationship, activity, or interest related to the content of this article.

Data sharing statement

The present review is based on the references cited. Further details, opinions, and interpretation are available from the corresponding authors on reasonable request.

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