

# Clinical Risk Factors for NonSalvageable Testis in Testicular Torsion Patients

<sup>1</sup>Besut Daryanto, <sup>2</sup>I Made Udiyana Indradiputra, <sup>3</sup>Paksi Satyagraha

**Abstract--***This retrospective study was conducted to describe and analyze the clinical risk factors of non salvageable affected testis in pediatric and adult testicular torsion patients in Saiful Anwar Hospital Malang. Orchiectomy and contralateral orchidopexy were performed to 63 patients (90%) due to non-viable affected testis, with the left testis as the most commonly affected (48 patients/68.6%). It was found that symptom onset more than 6 hours was associated to increase the likelihood of non-salvageable testis/orchiectomy (odds ratio/OR 155; 95% confidence interval =11.9-2020.3,  $p<0.001$ ). Lesser degree of torsion was also associated with likelihood of salvageable testis (OR 0.992; 95% confidence interval=0.985-0.999,  $p=0.032$ ), with most torsion cases were medially rotated (91.4%). Vertical testicular position during initial examination is associated with less risk of orchiectomy (OR 0.159, 95% confidence interval=0.031-0.812,  $p=0.034$ ). It was revealed that phren's test result, and the presence of cremaster reflex during initial examination had no association with surgical outcome, and so did the laboratory result ( $p>0.05$ ). The duration of symptoms until detorsion was the most important modifiable factor of salvageable testis in testicular torsion patient, hence immediate (<6 hours) detorsion by surgical exploration is recommended. The degree of torsion along with testicular position was affected the likelihood of orchiectomy. Proper health education and direct referral to hospital may reduce this delay for reducing orchiectomy rate in the future.*

**Key words--***Testicular torsion, clinical risk factor, orchiectomy*

---

## I. INTRODUCTION

Torsion of the testis or twisting of the spermatic cord is a urological emergency usually occurring in young males. It is the most common cause of testicular loss in adolescents and neonates. The annual incidence of spermatic cord torsion is 4.5 per 100 000 males aged less than 25 years.<sup>1</sup> It can occur at any age but usually occurs in younger males, with a bimodal incidence in the pediatric population, specifically during the first year of life and between the ages of 13 and 16 years. Orchiectomy rate of all pediatric and adult testicular torsion in Saiful Anwar Hospital was 90%.<sup>2</sup> This retrospective study was conducted to describe and analyze the clinical risk factors of non salvageable affected testis in pediatric and adult testicular torsion patients in Saiful Anwar Hospital Malang, Indonesia. Result of this study is expected to be able to determine preventable risk factor to prevent and decrease orchiectomy rate in future testicular torsion patient.

## II. MATERIAL & METHODS

From January 2001 to August 2016, 70 data of testicular torsion cases that conducted surgery in Saiful Anwar Hospital were retrospectively collected. The data were described and analyzed based on clinical risk

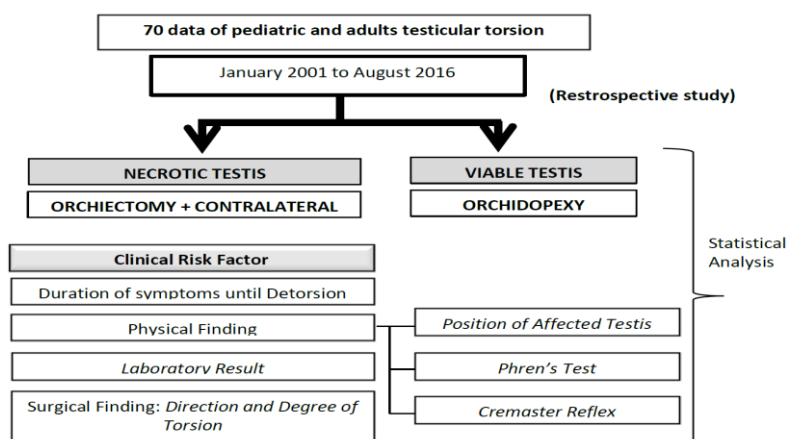
---

<sup>1</sup> Department of Urology, Faculty of Medicine University of Brawijaya - Saiful Anwar Hospital, Malang, Indonesia, Email: besut.daryanto@yahoo.co.id

<sup>2</sup> Department of Urology, Faculty of Medicine University of Brawijaya - Saiful Anwar Hospital, Malang, Indonesia.

<sup>3</sup> Department of Urology, Faculty of Medicine University of Brawijaya - Saiful Anwar Hospital, Malang, Indonesia.

factors (duration of symptom until detorsion, physical finding including position of affected testis, phren's test, cremaster reflex; laboratory result; surgical finding including: direction and degree of torsion) for each surgical management. The data were analyzed using statistical analysis software (SPSS). Odds ratio were described and logistic regression analysis was performed to ascertain the association of time between duration of symptoms onset and detorsion, and also degree of cord twisting to the viability of affected testis.

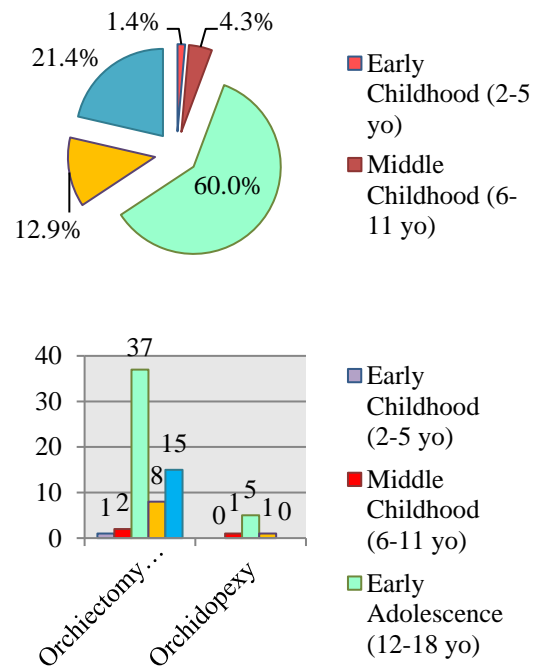


**Figure 1.** Retrospective Research Methods

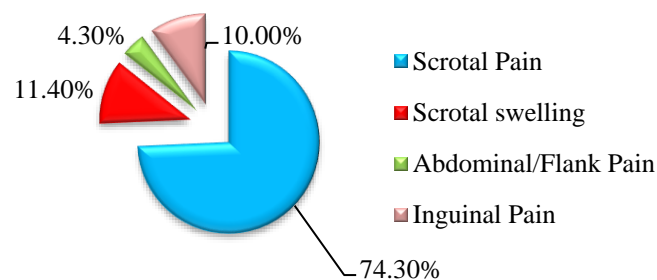
### III. RESULTS

Most of testicular torsion cases in Saiful Anwar Hospital occur in early adolescence age group (12 until 18 years old), followed by adult (>21 years old). The least incidence was early childhood. No neonatal cases were reported might due to underdiagnosed. Initial complain of testicular torsion into our hospital was varied. Patients seek medical attention commonly due to unilateral scrotal pain (74.3%), with left testis as the most commonly affected (68.6%). Other common symptoms is scrotal swelling (11.4%). Orchiectomy and contralateral orchidopexy were performed to 63 patients (90% cases) due to non-viable affected testis, with the left testis as the most commonly affected (48 patients/68.6%). Most of them is in early adolescence age (41.1%).

We did analysis for clinical risk factors, by performing multivariate analysis. Mean BMI of our patient is  $85.6 \pm 2.9$  kg/m<sup>2</sup>. There is no significant association between BMI and treatment ( $p=0.611$ ). There is no significant association between Temperature and treatment ( $p=0.905$ ). Vertical testicular position during initial examination is associated with less risk of orchiectomy (OR: 0.159;  $p=0.034$ , 95% CI 0.031-0.812). There is no significant association between cremaster reflex and treatment ( $p=0.419$ ). Laboratory result (CBC and Urinalysis) had no association with surgical outcome ( $p>0.05$ ). It was found that symptom onset more than 6 hours was associated to increase likelihood of non-salvageable testis (OR: 155;  $p=0.001$ , 95% CI 11.9-2020.3). Increasing degree of torsion was also associated with likelihood of orchiectomy (OR 0.992, 95% CI: 0.985-0.99;  $p=0.032$ ). Most cases were medially rotated (91.5%). Average length of stay after surgical management was  $3.7 \pm 1.3$  days and no complication was found during follow up. Fertility issue needs to be evaluated especially in post orchiectomy patient.



**Figure 2. A.** Testicular Torsion based on age group. **B.** Surgical treatment based on age group

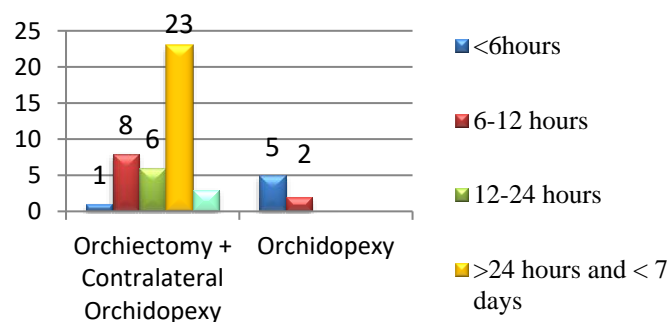


**Figure 3.** Initial Presentation to Emergency Department

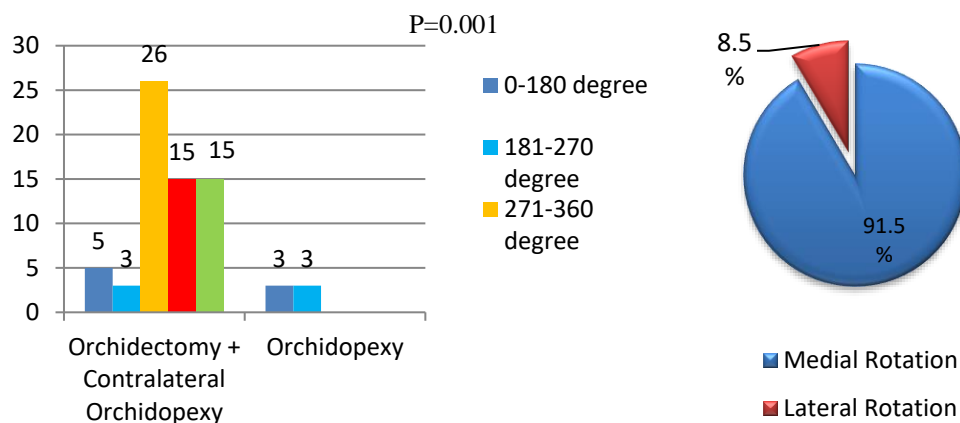
**Table 1.** Multivariate Analysis of clinical risk factor of orchiectomy in testicular torsion's patient.

Clinical Factor		Treatment		Total	OR	95% CI	P value
		Orchiectomy + Contralateral Orchidopexy	Orchidopexy				
Symptoms Duration (hour/prior surgery)	> 6hours	62 (88.6%)	2 (2.9%)	64 (91.4%)	155	11.9-2020.3	0.001
	< 6 hours	1 (1.4%)	5 (7.1%)	6 (8.6%)			
Fever	Fever	8 (11.4%)	1 (1.4%)	9 (12.8%)	0.873	0.093-8.224	0.905
	No	55 (78.6%)	6 (8.6%)	61 (87.1%)			
Testis Affected	Right	19 (27.1%)	3 (4.3%)	22 (31.4%)	0.576	0.117-2.825	0.670
	Left	44 (62.9%)	4 (5.7%)	48 (68.6%)			

Position of Affected testis	Vertical	11 (15.7%)	4 (5.7%)	15 (21.4%)	0.159	0.031-0.812	0.034
	Horizontal	52 (74.3%)	3 (4.3%)	55 (78.6%)			
Phren test	Decreased pain	11 (15.7%)	1 (1.4%)	12 (17.1%)	1.269	0.139-11.264	0.833
	Persisting Pain	52 (74.3%)	6 (8.6%)	58 (82.9%)			
Cremaster Reflex	Persisting reflex	4 (5.7%)	1 (1.4%)	5 (71.4%)	0.407	0.039-4.251	0.419
	Decrease or no Reflex	59 (84.3%)	6 (8.6%)	65 (92.6%)			
Leucocytosis	Leucocytosis	16(22.9%)	3 (4.3%)	19 (27.1%)	0.454	0.092-2.250	0.379
	No	47 (67.1%)	4 (5.7%)	51 (72.9%)			
Hematuria	Hematuria	10 (24.4%)	1 (2.4%)	11 (26.8%)	1.11	0.103-11.965	0.931
	No	27 (65.9)	3 (7.3%)	30 (73.2%)			
Leucocyturia	Leucocyturia	10 (21.3%)	1 (2.1%)	11 (23.4%)	0.909	0.085-9.736	0.937
	No	33 (70.2%)	3 (6.4%)	36 (76.6%)			
Twisting Direction	Laterally twisted	5 (7.1%)	1 (1.4%)	6 (8.5%)	0.517	0.052-5.189	0.482
	Medially twisted	58 (82.9%)	6 (8.6%)	64 (91.5%)			
Degree of twisting	0-180°	5 (7.1%)	3 (4.3%)	8 (11.4%)	0.992	0.985-0.999	0.032
	181-270°	3 (4.3%)	3 (4.3%)	6 (8.6%)			
	271-360°	26 (37.1%)	0	26 (37.1%)			
	361-540°	15 (21.4%)	0	15 (21.4%)			
	541-720°	14 (20%)	1 (1.4%)	15 (21.4%)			
BMI category	Non Obese	51 (72.9%)	6 (8.6%)	57	0.931	0.705-1.228	0.611
	Obese	12 (17.1%)	1 (1.4%)	13			
Age	0-18 yo	40 (57.1%)	6 (8.6%)	46	0.290	0.033-2.560	0.409
	>18 yo	23 (32.9%)	1 (1.4%)	24			



**Figure 4.** Time since initial symptom until detorsion related to treatment outcome



**Figure 5.** Categorical variable of degree of rotation related to treatment outcome



**Figure 6.** A. Viable testis (before and after detorsion) B. Non viable testis (Source: Urologi Malang medical record)

## IV. DISCUSSION

In our study, most of testicular torsion cases occur in early adolescence age group (12 until 18 years old), followed by adult (>21 years old). In other study, the incidence is estimated to be 1 in 4000 in males younger than 25 years old. Approximately 65 percent of cases occur in boys between the ages of 12 and 18 years.<sup>1</sup> No neonatal cases were reported might due to underdiagnosed. Initial complain of testicular torsion into our hospital was varied. Patients seek medical attention commonly due to unilateral scrotal pain (74.3%), with left testis as the most commonly affected (68.6%). Other common symptom is scrotal swelling (11.4%). The classic presentation of testicular torsion is sudden onset of severe unilateral testicular pain.<sup>3,4,5</sup>

Scrotal exploration procedure is performed by grasp the scrotum with the thumb and index finger, and press the testis forward. The scrotum maybe edematous, Para raphe incision is performed. Continue the incision to the tunica vaginalis, which may appear darkened from contained bloody serum. pen the tunica vaginalis, evacuate the accumulated hydrocele fluid, and extrude the testis. Observe its color after untwisting it clockwise on the right, counterclockwise on the left. Wrap it in warm saline sponges and observe it for 10 or 15 minutes. If the testis become red and sanguinous, proceed with orchidopexy. If the testis remains dark, proceed with orchidectomy. In our review orchietomy and contralateral orchidopexy were performed to 63 patients (90%) due to non-viable affected testis, with the left testis as the most commonly affected (48 patients/68.6%). Most of

them is in early adolescence age. Orchiectomy rates vary widely in the literature, typically ranging from 39% to 71% in most series.<sup>6</sup>

By performing multivariate analysis, it was found that symptom onset more than 6 hours was associated to increase likelihood of non-salvageable testis (OR: 155;  $p=0.001$ , 95% CI 11.9-2020.3). In several literatures, testicular salvage rates are 90% to 100% if surgical exploration is performed within six hours of symptom onset, decrease to 50% if symptoms are present for more than 12 hours.<sup>5,6</sup> Mean BMI of our patient is  $85.6 \pm 2.9$  kg/m<sup>2</sup>. There is no significant association between BMI and treatment ( $p=0.611$ ). There is no significant association between Temperature and treatment ( $p=0.905$ ). Vertical testicular position during initial examination is associated with less risk of orchiectomy (OR: 0.159;  $p=0.034$ , 95% CI 0.031-0.812). There is no significant association between Cremaster Reflex and treatment ( $p=0.419$ ). Laboratory result (CBC and Urinalysis) had no association with surgical outcome ( $p>0.05$ ). Increasing degree of torsion was also associated with likelihood of orchiectomy (OR 0.992, 95% CI: 0.985-0.99;  $p=0.032$ ). Most cases were medially rotated (91.5%). One of the most determinant salvage rate of testis is degree of cord twisting.<sup>4</sup> Average length of stay after surgical management was  $3.7 \pm 1.3$  days and no complication was found during follow up. Fertility issue needs to be evaluated especially in post orchiectomy patient.

## V. CONCLUSION

The duration of symptoms until detorsion was important modifiable factor of salvageable testis in testicular torsion patient, hence immediate (<6 hours) detorsion by surgical exploration is recommended. The degree of torsion along with testicular position was affected the likelihood of orchiectomy. Proper health education and direct referral to hospital may reduce this delay for reducing orchiectomy rate in the future.

## REFERENCES

1. Brenner JS, Ojo A. (2016). Causes of scrotal pain in children and adolescents. Uptodate, [online]. Available at: <http://www.uptodate.com/contents/causes-of-scrotal-pain-in-children-and-adolescents> [Accessed 2 January 2016].
2. Daryanto, B, et al (2015). Pediatric testicular torsion in saifulanwar hospital Malang Indonesia, APAPU 2016, Zhengzhou China.
3. Sharp, V. J., Kieran, K., & Arlen, A. M. (2013). Testicular torsion: diagnosis, evaluation, and management. *American family physician*, 88(12).
4. Tekgül, S., Riedmiller, H., Gerharz, E., Hoebeke, P., Kocvara, R., Nijman, R. & Stein, R. (2016). Guidelines on paediatric urology. *European Association of Urology Guidelines*
5. Palmer, J. S. (2016). Abnormalities of the external genitalia in boys. *Campbell-Walsh Urology. 11th ed. Philadelphia, PA: Elsevier Saunders*.
6. Ramachandra, P., Palazzi, K. L., Holmes, N. M., & Marietti, S. (2015). Factors influencing rate of testicular salvage in acute testicular torsion at a tertiary pediatric center. *The western journal of emergency medicine*, 16(1), 190-194.
7. Visser AJ, Heyns CF. (2003) Testicular function after torsion of the spermatic cord. *BJU Int*;92:200–3.
8. Yang, C., Song, B., Tan, J., Liu, X., & Wei, G. H. (2011). Testicular torsion in children: a 20-year retrospective study in a single institution. *The Scientific World Journal*, 11, 362-368.
9. Tchantchaleishvili, V. Preface to the Journal of Cardiovascular Disease Research, third issue 2011(2011) *Journal of Cardiovascular Disease Research*, 2 (3), pp. 139-140. DOI: 10.4103/0975-3583.85259
10. Al-Jaleeli, Y.A.E. On-line test model for people with visual impairment using information technology and braille(2018) *International Journal of Pharmaceutical Research*, 10 (4), pp. 255-258. <https://www.scopus.com/inward/record.uri?eid=2s2.085056113597&partnerID=40&md5=eb192c3380f5af0078e2562bca26cb7d>
11. Shah P, Bhalodia D, Shelat P. "Nanoemulsion: A Pharmaceutical Review." *Systematic Reviews in Pharmacy* 1.1 (2010), 24-32. Print. doi:10.4103/0975-8453.59509