



Indicators and outcomes of transfer to tertiary pediatric hospitals for patients with testicular torsion

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Summary

Introduction

Testicular torsion threatens testicular viability with increased risk of loss with delayed management. Still, healthy adolescents continue to be transferred from community hospitals to tertiary hospitals for surgical management for torsion even though adult urologists may be available. We sought to determine reasons behind patient transfer and to evaluate whether transfer to tertiary centers for testicular torsion leads to increased rates of testicular loss.

Materials and methods

A retrospective chart review was performed for patients presenting to our free-standing pediatric tertiary care facility with surgically confirmed testicular torsion during the 5-year period between January 2011 and January 2016. Data was collected regarding transfer status, patient demographics, time of presentation to our facility, duration of symptoms, patient workup, and surgical outcomes. Patients with perinatal or intermittent torsion were excluded.

Results

One-hundred and twenty-five patients met the inclusion criteria. Thirty-six of those were transferred from outside facilities while 89 presented directly to our hospital. A greater proportion of the transferred patients presented during nights or weekends than those presenting directly to our facility (77.8% versus 51.7%, $p = 0.009$). Eighty-nine patients presented with symptom duration of less than 24 h and

had potentially viable testicles. Of those, 23 were transferred and 66 presented directly to our hospital. Differences are shown in the Table. Transferred patients had twice the rate of testicular loss as those not transferred, although the results were not significant (30.4% versus 15.2%, $p = 0.129$). Patients undergoing ultrasound prior to transfer had prolonged symptom duration and faced higher rates of testicular loss when compared with patients not transferred, although the latter was not significant (mean duration 8.0 versus 4.9 h, $p = 0.025$, and testicular loss 40.0% versus 15.2%, $p = 0.065$, respectively). Patients transferred over 30 miles had over 2.5 times the rate of testicular loss than those not transferred (42.8% versus 15.2%, $p = 0.029$).

Discussion

This study is unique in its examination of motivations for transfer of patients presenting with testicular torsion and in its evaluation of the impact of transfer on testicular salvage rates for potentially viable testicles (those with less than 24 h since symptom onset).

Conclusion

Patients are more likely to be transferred to our tertiary pediatric facility for management of testicular torsion during the night or weekend. Transferring patients for management of testicular torsion delays definitive management and threatens testicular viability, especially in those transferred greater distances. Urologists at the facility of initial patient presentation should correct testicular torsion when able.

Table Comparison of patients presenting with symptom duration <24 h: transfer status, ultrasound status, and transfer distance

	Transferred		<i>p</i> -value	Ultrasound Not transferred prior to transfer		<i>p</i> -value	Transferred >30 miles		<i>p</i> -value
	<i>n</i> = 23	<i>n</i> = 66		<i>n</i> = 15	<i>n</i> = 66		<i>n</i> = 14	<i>n</i> = 66	
Duration of symptoms, hours	Mean 12.8 range 0.4–17.9 SD 4.3	Mean 14.1 range 3.6–21.7 SD 3.0	0.116	Mean 8.0 range 3.1–18.2 SD 5.1	Mean 4.9 range 0.5–23.3 SD 4.6	0.025	Mean 7.1 range 2.6–18.2 SD 5.1	Mean 4.9 range 0.5–23.3 SD 4.6	0.121
Testicular loss	30.4%	15.2%	0.129	40.0%	15.2%	0.065	42.8%	15.2%	0.029

Introduction

Testicular torsion remains the leading cause of testicular loss in adolescents [1,2]. Timing from symptom onset to repair is the main factor affecting testicular loss [3–6]. While patients with torsion may require transfer to tertiary facilities for management because of complex medical conditions or lack of local urologic coverage, transfers of healthy adolescents from hospitals served by board certified urologists also occur. The American Board of Urology (ABU) considers management of testicular torsion to be part of core urologic training and recently stated “the Board does not support the practice of urologists on call deferring routine pediatric care to subspecialty certified colleagues in order to avoid call cases” [7].

Transferring patients may be encouraged by the lack of data surrounding transfer rates and testicular loss. Prior studies suggested an association between patient transfer and increased risk of orchiectomy [8]; transfer distance and duration of symptoms have been shown to be associated with orchiectomy rate, although transfer status alone was not an independent factor [9]. Still, these studies suffered from inclusion of patients with symptom duration over 24 h (with only remote possibility of salvage) [10], which may have contributed to the negative findings. Given that testicular salvage in torsion is a time-dependent issue and transfer increases the time from presentation to management, it would follow that patients being transferred are at increased risk for testicular loss.

We sought to determine reasons for transfer of otherwise healthy patients with testicular torsion. We hypothesized that patients are more likely to be transferred when presenting during inconvenient times, that is, at nights and weekends, and that patients are more likely to be transferred if they have public insurance. Moreover, we sought to evaluate whether transfer to a tertiary center for testicular torsion leads to increased rates of testicular loss.

Methods

With institutional review board approval, we performed a retrospective review of patients with surgically confirmed testicular torsion presenting to our facility, an urban stand-alone tertiary pediatric hospital, between January 2011 and January 2016. Data collected for each patient included demographic data, information about symptoms and presentation, timing of workup, and testicular viability. We excluded events of perinatal torsion and patients with delayed repairs for intermittent torsion. Because exact information regarding timing of initial presentation to outside facilities was unknown, time of presentation was recorded for arrival to the emergency department at our tertiary care facility. Duration of symptoms was calculated using the difference between patient-reported symptom onset and the time of presentation to our facility.

Patients were divided into two groups: transferred and not transferred. Patients were classified as being transferred if they were referred to our emergency department (ED) after being initially evaluated at institutions where our urologists do not provide coverage. Patients were considered not to have been transferred if their initial

presentation was to our ED or a facility where our urologists are covering staff, such as urgent care facilities owned by our hospital. Patients presenting initially to their primary care providers were also considered not to be transferred, as these patients initially presented to institutions without urology coverage.

Patients were also classified into two groups according to time of arrival at our ED: daytime or nighttime/weekend. Daytime arrival included patients presenting between 6 am and 6 pm Monday through Friday. Nighttime and weekend arrival included patients who presented during the weekend (Friday at 6 pm to Monday at 6 am) or Monday through Thursday night between 6 pm and 6 am.

To evaluate testicular viability, we selected the subgroup of patients presenting with duration of symptoms <24 h. Testicles were considered non-viable if they had ischemia requiring orchiectomy at surgery or if there was evidence of severe atrophy at follow-up. Data were compared for patients transferred from outside institutions and those not transferred. Rates of testicular salvage were compared. Transferred patients were further stratified based on distance of transfer from initial presenting institution to our facility and whether an ultrasound was performed prior to transfer. Data were found to be normally distributed. Univariate analysis was performed using Student *t* test and Fisher’s exact tests. Multivariate analysis for predicting testicular loss in patients with symptoms <24 h was performed by logistic regression analysis using variables found to have *p*-value <0.20 on univariate analysis. A *p*-value <0.05 was considered to be significant.

Results

During the study period, 152 patients with torsion were treated, 19 of whom had perinatal torsion and were excluded. Of the remaining 133 patients, three patients elected for delayed orchiopexy for testicular torsion with spontaneous detorsion by the time of evaluation at our institution and were also excluded. Timing of symptom onset was unknown for four patients and one patient was initially diagnosed with epididymitis prior to being diagnosed with torsion later because of ongoing pain; these patients were excluded. Of the 125 remaining patients, mean age was 13.4 (range 4 months–21.7 years, standard deviation 3.8 years). Four patients were adults (age ≥18 years) at the time of evaluation; all of whom presented initially to our ED. Mean time from symptom onset to evaluation in our ER was 21.4 h (range 0.5–184.5 h; standard deviation 32.1 h).

Thirty-six patients were classified as transferred. Of the 89 patients not transferred, 58 presented directly to our ED, 26 presented to an urgent care facility within our hospital system, and five were referred from their primary care provider. Results of the two groups are presented in [Table 1](#). There was no difference between the groups with regards to age (mean 13.1 years for those transferred versus 13.5 years for those not transferred; *p* = 0.625). Duration of symptoms in the transferred group was 28.0 h compared with 18.7 h for those not transferred (*p* = 0.144). While 51.7% of patients not transferred presented to our facility during inconvenient hours (nights/

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