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## Patterns of care in testicular torsion: Influence of hospital transfer on testicular outcomes



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**Abstract** *Objective:* To investigate patterns of care for testicular torsion and influence of hospital transfers on testicular outcomes. Hospital transfer may be a source of treatment delay in a condition where delays increase likelihood of orchiectomy.

*Methods:* We used a retrospective cohort of Californian males with ICD-9/CPT-defined torsion from inpatient, emergency department (ED), and ambulatory surgery center (ASC) data. Logistic regression assessed predictors of orchiectomy.

*Results:* Predictors of orchiectomy were ages <1 year (OR 19.2, 95% CI 6.3–58.9), 1–9 years (OR 2.7, 95% CI 1.4–5.2), and ≥40 years (OR 6.6, 95% CI 3.1–13.9) (vs. masked age). Treatment at mid-volume (vs. high-volume) facilities was associated with lower odds of orchiectomy (OR 0.5, 95% CI 0.3–0.7). Rural location, non-private insurance, and hospital transfer were associated with orchiectomy on univariate but not multivariate analysis. During 2008–2010, 2794 subjects experienced torsion (average incidence 5.08 per 100,000 males yearly). Encounters occurred in ASCs (55%), inpatient facilities (36%), and EDs (9%). 60% of subjects were privately insured, 2% experienced hospital transfer, and 31% underwent orchiectomy.

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**Conclusion:** Our census found that most cases of testicular torsion were treated in outpatient settings. Hospital transfer was not associated with orchiectomy.

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## Introduction

Testicular torsion is a surgical emergency occurring in 3.8 per 100,000 boys [1]. Treatment delays beyond 6 h increase the likelihood of irreversible ischemia and subsequent orchiectomy [2]. Orchiectomy occurs in up to 41% of torsion cases [1] and can result in reduced fertility, testicular hormonal dysfunction [3], and psychological trauma [4]. As such, torsion is the third leading cause of malpractice lawsuits among teenage boys [5].

Patient transfers between hospitals are a potential source of treatment delay. Transfers result in worse outcomes with other time-sensitive conditions, such as myocardial infarction [6], but no study has definitively proven this association with testicular torsion [7]. Physicians initiate transfers because of real or perceived lack of resources at the originating hospital; therefore not all transfers may be necessary. If transfers contribute to poor outcomes, interventions to identify and reduce inappropriate transfers could improve quality of care.

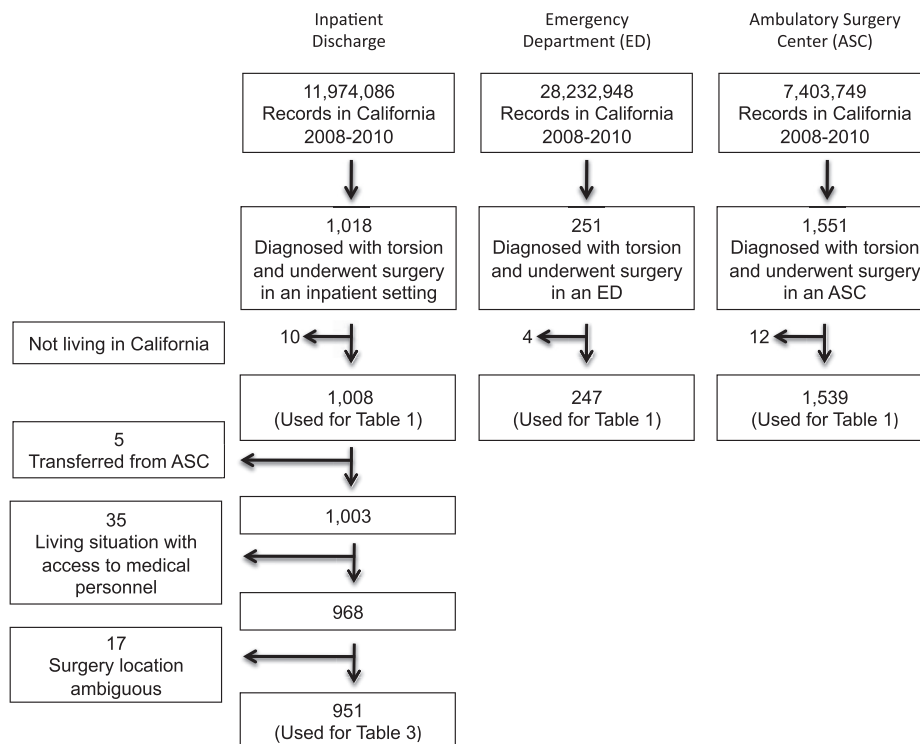
We used an administrative database encompassing every patient encounter occurring in an inpatient, emergency department, or ambulatory surgery setting in California to provide comprehensive epidemiology on patterns of care in the management of patients with testicular torsion. We

also assessed whether inter-hospital transfers influenced torsion outcomes with the hypothesis that hospital transfers increase orchiectomies.

## Materials and methods

**Data source:** We used a 2008–2010 retrospective cohort provided by the California Office of Statewide Health Planning and Development (OSHPD) containing Emergency Department (ED), Ambulatory Surgery Center (ASC), and Inpatient Discharge files. California mandates reporting of every medical encounter occurring at these locations. To protect confidentiality, OSHPD masked records starting with age and ethnicity/race in subjects with unique demographic combinations. OSHPD-recommended California Department of Finance population estimates were used to calculate incidence rates.

**Inclusion criteria:** We included males of all ages with an ICD-9 code for testicular torsion (608.2×) and a CPT/ICD-9 procedure code for reduction of torsion, testicular fixation, or orchiectomy (61.19, 62.30, 62.50, 63.52, 608.20, 608.21, 608.22, 608.23, 608.24, 63.52, 54,600, 54,620, 54,520, 55,110). Patients with suspected appendix testis torsion or a scrotal exploration were included only if they also underwent a concurrent orchiopexy or orchiectomy.



**Figure 1** Construction of study cohort.

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