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Clinical Safety Recommendations for Testicular Torsion: Analysis of 101 Claims Settled with Compensation in Spain and France

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Abstract
Introduction: The study aimed to analyze testicular torsion (TT) claims settled with compensation to have data available as the basis for making recommendations to decrease clinical risk and prevent claims. TT is a urological emergency with a high rate of orchiectomy, representing one of the main reasons for urological claims. ***Methods:*** Data were analyzed from personal majority policy and from the public sector of Catalonia (Spain), as well as data from the main medical civil liability insurance firm at healthcare centers in France in the period from January 1, 2000 to December 31, 2018. ***Results:*** Fifty Spanish and 51 French cases were analyzed. Statistical differences were logged in the two settings analyzed in performing ultrasounds, in the area where primary care was provided and with regard to settlement amounts. Diagnosis was late in 76.2% of cases. ***Discussion:*** The medical action time from the onset of symptoms and Doppler testicular ultrasound in cases of questionable differential diagnoses is key to prognoses to save the testicles. Properly filling out the emergency report and the rest of medical records are essential for receiving correct medical care and defending possible claims.

Introduction

The clinical presentation of acute scrotal pain includes testicular torsion (TT). TT is a urological emergency that occurs in 3.8–4.5 cases per 100,000 males under 25 years of age [1, 2]. The orchiectomy rate for TT is high (up to 40% according to several studies) and particularly affects younger patients, which tends to entail a significant negative impact on these boys' and teenagers' overall, sexual, and psychological development. For this reason, TT requires early diagnosis and surgery.

Urology is considered a speciality with a moderate-high risk of claims for medical professional liability (MPL), and testicular disorders are among the pathologies with the highest claims in this field [3–6]. Thus, TT is one of the diagnoses most commonly involved in MPL claims in urology and, more specifically, among pediatric patients. It is considered one of the main reasons for pe-

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diatric negligence in emergency services [7, 8] and one of the areas for potential improvement in clinical safety (CS).

The lack of widespread comprehensive records on adverse events in CS makes its analysis and prevention difficult. Thus, data stemming from claims for alleged MPL represents a recognized source – and still underutilized – for learning from errors and improving CS [9, 10]. These data can be accessed via studies on sentences or, more broadly and directly, by analyzing the databases managed by MPL insurers, which include both judicial cases and extrajudicial claims. Among all the cases included in databases managed by MPL insurance firms, cases settled with compensation (by judicial sentence or extrajudicial agreement) are those that allow for the most significant learning from errors. The present paper analyzes MPL claims related to TT in cases settled with compensation, either through judicial sentences or out-of-court agreements, in two different contexts (Spanish and French), with the aim of having data available on which to base CS recommendations to decrease the risk and consequences of acute scrotal pain, as well as to report on critical situations in the clinical handling of medical symptomatology that entails a high risk of compensation by MPL.

Materials and Methods

The Professional Liability Service of the Council of Medical Associations of Catalonia (CCMC) handles the majority MPL policy in Catalonia (over 26,000 doctors) and has recorded all the claims against insured professionals since 1986. Moreover, the insurance brokerage firm CONFIDE registers all claims filed against the health administration for alleged MPL in the public sector in Catalonia (Spain). In turn, the insurance company *Société Hospitalière d'Assurances Mutuelles* (SHAM) is the main medical civil liability insurer at healthcare cenetrs in France.

The three databases described were used to identify claims related to acute testicular pain due to TT in the period between January 1, 2000 and December 31, 2018. The claims selected were those in which the existence of MPL was determined and, consequently, compensation, from either a judicial sentence or an extrajudicial agreement. Claims were identified electronically, with anonymized data extraction by encrypting the cases and analyzing different clinical variables, medicolegal and judicial: complaint procedures (judicial or extrajudicial), compensation amount, speciality of the professionals who conducted the initial consultation and final diagnosis, area of care and type of healthcare center where the initial assistance and final diagnosis took place, patient's age, reason for consultation, the time between the appearance of symptomatology and consultation (subsequently divided into 3 categories: 0–6 h/7–12 h/over 12 h), time at which care was provided (subsequently divided into three categories: 08:01–15:00, 15:01–22:00, and 22:01–08:00), first diagnosis made, whether or not a testicular ultrasound was conducted, time lapsed until the final diagnosis (subsequently divided into three categories: 2–12 h/13–24 h/over 24 h), testicle affected (laterality), and complementary tests conducted.

SPSS software (version 24.0) was used to log data and the descriptive and bivariate analysis. Time trends were calculated by linear regression. Quantitative variables were compared using Student's t test, and qualitative variables were compared with Pearson's χ^2 test.

Results

During the period between January 1, 2000 and December 31, 2018, a total of 333 cases of TT claims were identified and reviewed in the Spanish ($n = 80$) and French ($n = 253$) databases analyzed. Of the 80 Spanish cases, 67 (83.75%) had been resolved at the time of the study, and 50 had concluded with the payment of compensation (74.63%). Of the 253 cases in France, 202 (79.84%) were settled cases. There were 85 (42.08%) cases with compensation, although we only had complete information on 51 of them.

No time trends were observed in the distribution of total cases ($p = 0.130$), Spanish cases ($p = 0.096$), or French cases ($p = 0.440$). In general, there were no statistically significant differences between the two samples, except in ultrasounds being performed for diagnosis, the place of first assistance, and the speciality of the doctor who made the final diagnosis. In Spain, an ultrasound was done in 6% of cases, while in France, this percentage was 27.45% ($p = 0.0089$).

Testicular loss occurred in all claims analyzed. Patients' average age was 18.09 (SD = 7.941 years). The reasons for consultation were testicular pain ($n = 76$; 75.25%), abdominal pain ($n = 20$; 19.80%), lower back and testicle pain ($n = 3$; 2.97%), and testicular contusion ($n = 2$; 1.98%). When symptoms began, 84% of cases (69% in Spain and 98% in France) went to a hospital emergency room (71% basic level and 13% tertiary level), while 16% went to primary care, where statistically significant differences were seen between the samples ($p < 0.0005$). The majority of patients was attended by family practitioners ($n = 66$; 65.3%) on their first visit; 15.8% by general surgeons; and 7.9% by pediatricians. Only 1 patient's first consultation was with a urologist. 9.9% of cases were attended by resident doctors ($n = 10$).

63.2% of patients were attended within the first 6 h after symptoms started, while 14.9% were attended between 7 and 12 h and 21.8% over 12 h. Patients in the French database went for consultations earlier, within the first 6

h after symptoms started (71.1% of cases), compared to those from the Spanish database (54.8%). The distribution of the time ranges when consultations and care took place was a majority (42.7%) in the afternoon (15:01–22:00), 31.3% at night (22:01–08:00), and 26% in the morning (08:01–15:00). The most frequent diagnosis was orchiepididymitis (60.4%), followed by abdominal pain/gastroenteritis (17.7%), while TT was only initially diagnosed in 8.3% of cases. Ultrasounds were only performed in the initial diagnosis in 16.83% of cases, with statistically significant differences in both samples ($p = 0.0065$): in Spain, ultrasounds were done in 6% of cases, while in France, this percentage was 27.45%.

In 76.2% of cases, the diagnosis of TT took place after 24 h and only within the first 12 h in 5% of cases. In the final diagnosis, complementary tests were employed in 93.9% of cases (only ultrasound in 92.9% and ultrasound plus magnetic resonance imaging in 1.0% of cases). Differences were observed between the speciality of the doctor who made the final diagnosis ($p = 0.0061$). The speciality of urology was most frequent (86.7% of cases; 96.1% in French and 76.6% in Spanish cases). There were also statistically significant differences in the compensation amount by region of study ($p < 0.0005$). The average compensation in French cases was 9,552.84 EUR (SD 7,425.06 EUR), while this amount was 41,059.88 EUR in Spanish cases (SD 9,441.06 EUR).

Discussion

The different origins of the sample cases did not have statistically significant differences, which reveals that these clinical features are hard to manage and that – regardless of the different characteristics of the settings in which they occur – it can be objectively stated that they do lead to MPL compensations. This points to the fact that the results obtained can be largely extrapolated to the overall European setting. The compensation rate for claims based on TT was 50.18% (74.63% for Spanish cases and 42.08% for French cases), showing rates lower than the USA, where rates of 67% [11] have been reported.

The clinical features of acute scrotal pain in emergency rooms tend to cause diagnostic uncertainty, primarily between the clinical presentation of orchiepididymitis and TT. Atypical clinical presentations, false-negative examinations, and ultrasound findings were frequent in the cases with claims. Despite the fact that two-thirds of the TT symptomatology had testicular pain, abdominal pain as the only manifestation is a common occurrence, ending up as an important cause of late diagnosis and treatment, entailing greater associated testicular loss. This reveals that a testicular exam is essential in all boys and male teenagers with acute abdominal pain [12, 13].

Due to being acute symptoms, it is logical that the results obtained show that the majority of initial care occurred in an emergency unit at a hospital center (84%). However, the results revealed statistically significant differences between the samples ($p < 0.0005$). This fact can mainly be explained by the different forecast uses of medical devices existing in each health system. Thus, in France, emergency care is generally done directly at a hospital, while in Spain emergency outpatient networks are sometimes used. With regard to the medical professional most often involved in the initial examination and diagnosis of TT, an emergency doctor and, generally, a family practitioner were most common (65.3%), which reveals the need for these professionals to have the recommendations and learnings from the present analysis available.

Testicular preservation in TT cases largely depends on how early medical treatment is received [14]. Thus, it is an interesting fact that 63.2% of patients were attended within the first 6 h after symptoms started, which a priori – if no delays took place in diagnosis or surgery – would lead to ensuring testicular preservation. It merits mention that patients in the French database went for consultations earlier, within the first 6 h after symptoms started (71.1% of cases), compared to those from the Spanish database (54.8%). While the differences are not statistically significant, it would be advisable to explore the reasons why the French receive earlier care, with the aim of extrapolating these strategies to the Spanish setting. With regard to the time of initial medical care, the majority of patients went in the afternoon or night (74%), when there tend to be fewer urology specialists working, which should be born in mind for planning either a higher presence of urologists during these times or training other professionals on how to treat TT.

One extremely relevant piece of information is the different uses of ultrasounds in the two countries analyzed. It is clear that if there is a high suspicion of TT, surgery must be a priority, making a prior ultrasound exam unnecessary. However, an ultrasound is still recommended to confirm the diagnosis of epididymitis, heeding the frequent cases of diagnostic error due to confusing the symptoms of epididymitis with TT, which generally involves testicular loss. Indeed, in an analysis of claims for acute scrotal pain in the USA, ultrasounds had been performed in 80% of the cases with claims[11]. In the present study, erroneous diagnoses – when they existed – were

primarily for orchiepididymitis (60.4%), which was diagnosed based on a physical examination without performing an ultrasound exam. Ultrasounds were only performed in 16.83% of overall cases, with statistically significant differences in both samples ($p = 0.0065$): in Spain, ultrasounds were done in 6% of cases, while in France, this percentage was 27.45%.

The timeline for treating TT is fundamental. In pediatric offices, the parents should be informed that if their boys have testicular pain, they should go immediately to the hospital, which would contribute to reducing the high rate of orchiectomies [15]. Indeed, in the cases analyzed, all settled with compensation, in 76.2% of cases, the diagnosis of TT took place after 24 h and only within the first 12 h in 5% of cases. Along with patients' medical history and a physical examination, complementary tests can be extremely useful for the final diagnosis. Thus, in the sample analyzed, complementary tests were employed in 93.9% of cases (only ultrasound in 92.9% and ultrasound plus magnetic resonance imaging in 1.0% of cases). The Doppler ultrasound has a sensitivity and specificity of 97.3% and 99%, respectively, and is therefore the most useful imaging type to rule out TT [16, 17]. The statistically significant differences ($p = 0.0061$) that were observed depending on the speciality of the doctor who made the final diagnosis among the different fields analyzed would advise suitable training for all professionals. As was to be expected, urologists most commonly performed the final diagnosis (86.7% of cases; 96.1% in France and 76.6% in Spain), followed by pediatric surgery in 8.2%, although this percentage was residual in French cases (2%), compared to 14.9% of Spanish cases.

Moreover, analysis also revealed statistically significant differences in the compensation amount depending on the region under study ($p < 0.0005$), most likely due to the different scales used to assess damage, which clarifies the need for European standardization in classification and rating damages from healthcare [18]. The average compensation in French cases was 9,552.84 EUR, while in Spanish cases it was 41,059.88 EUR. Even in this last subgroup, average compensation was much lower than that which is registered in the USA (with compensation from 45,000 to 60,000 USD [11, 19], according to different studies).

Conclusions

TT is a surgical emergency, and the time before medical care is received after symptoms start is essential for the prognosis of testicular preservation. Diagnosis has always been considered clinical, after patients' medical history and a physical examination. So, for acute scrotal pain features in which the differential diagnosis is uncertain, diagnosis should not be based solely on medical history and a physical examination, since the testicular Doppler ultrasound ensures detection of those torsions that are wrongly interpreted in the physical examination as orchiepididymitis [17, 20]. Indeed, its use is recommended by clinical guidelines for diagnosing acute scrotal pain [21]. Thus, not performing an ultrasound is a potential legal risk [16]. Immediate surgical examination is also advisable, although some authors point out that this practice does not manage to decrease statistics on testicular loss [14, 22]. Atypical presentation types of TT as with exclusively abdominal pain are not infrequent. Thus, for nonspecific abdominal pain, basically in young males, an examination of the scrotal sac should be established in the examination dynamic [13]. The high percentage of compensation, as well as the high percentage of testicular loss[1], should be a reason enough to formalize action guidelines in emergency services for acute scrotal pain, including CS recommendations [23] in clinical practice guides.

For the correct diagnosis and suitable handling of TT, doctors' training in this area must be increased, and patients should be urgently examined when there is any clinical suspicion. All practitioners who treat young males in emergency services should be fully aware of the most common risks and diagnoses associated with the existence of professional medical liability [8]. Finally, remember that properly filling out the emergency report and other medical records, detailing the evolution time of pain, and a detailed examination are essential for proper medical care for TT and are fundamental for possible claims.

Statement of Ethics

This retrospective review of patient data did not require ethical approval in accordance with local/national guidelines. Written informed consent from participants was not required in accordance with local/national guidelines. This is a retrospective study covering a period of 19 years (from 2000 to 2018), and consequently, it is impossible to obtain, retrospectively, the informed consents of all subjects. Requiring individual consent would make it unfeasible to conduct the study. This circumstance exempts the need for informed consent.

Conflict of Interest Statement

The authors declare that they have no conflicts of interest.

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Author Contributions

Conceptualization: Vargas-Blasco César, Martin-Fumadó Carles, and Arimany-Manso Josep; methodology: Vargas-Blasco César, Benet-Travé Josep, and Fuz Frédéric; formal analysis: Benet-Travé Josep and Fuz Frédéric; writing – original draft preparation: Martin-Fumadó Carles; writing – review and editing: Vargas-Blasco César, Martin-Fumadó Carles, Arimany-Manso Josep, Benet-Travé Josep, Fuz Frédéric, Romero Georges, and Autran Melanie; formatting, Martin-Fumadó Carles. All authors have read and agreed to the last version of the manuscript.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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