

ORIGINAL RESEARCH

Incidence of Penile Fracture in Iran; a Cross-Sectional Study

Amir Hossein Rahavian¹, Mohammad Ali Hosseini², Jalil Hosseini^{3*}

1. Andrology research center, Yazd reproductive sciences institute, Shahid Sadoughi University of medical sciences, Yazd, Iran.
2. Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran.
3. Men's Health and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

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Abstract: **Background:** Penile fracture is a urological emergency requiring proper diagnosis and treatment. Limited studies conducted in Iran have reported high prevalence of this problem (9.9 per 100,000 male population). In this study, we also examined the causes and symptoms, as well as the type of treatment physicians choose so that in the future, we can use this data to educate physicians and other people in the community about this disease. **Methods:** First, all urologists across the country were contacted and informed about the project. Then, from February 2017 to February 2018, a pre-prepared questionnaire containing the required information was sent to them and they were asked to complete and send this questionnaire in case of a penile fracture. Then, every two weeks, we reconnected all urologists in different ways (email, phone call, virtual networks, etc.) and collected relevant data. Finally, all data were analyzed using SPSS software, version 19. **Results:** The incidence of penile fractures was estimated to be 2.5 per 100,000 men (from 0.38 in the age range of 69-60 years to 3.9 in the age range of 39-30 years). The most common causes of penile fractures were sexual intercourse (64.8%), followed by non-sexual trauma (16.9%) and masturbation (13.3%). Pain, edema and discoloration of the penis were the most common symptoms at the time of admission (83.6%) and most patients (84%) had referred to a physician within the first 24 hours after the accident. 78.9% of urologists believed in emergency surgical treatment, while 20.3% believed in delayed surgical treatment and 0.7% believed in supportive treatment. **Conclusion:** Because of the cultural diversity of Iran, the rate of penile fracture is very different in different parts of Iran, but its rate is much lower than previous studies.

Keywords: Penis; Fracture; Incidence; Iran

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1. Introduction

Penile fracture (PF) is defined as the rupture of the tunica albuginea layer of the penis (1). While this trauma is rare, it is a urological emergency requiring rapid diagnosis and decision in its treatment (2). The prevalence of PF in Iran is reported to be 1.1 to 9.9 per 100,000 male populations, and it is estimated that every urologist in Iran experiences one case of PF every 3.5 months (3). However, despite prompt treatment, PF causes long-term complications such as chordee and erectile dysfunction and urethral injury in patients (2, 4). Various

causes such as sexual intercourse in an inappropriate position, masturbation and trauma can cause PF (4-6).

One of the most common and unique causes of PF in the western regions of Iran is Taqandan, during which the person forcibly clicks or snaps or pushes the erect penis down to achieve detumescence (5). The prevalence of this disease in different regions of Iran varies according to cultural and geographical conditions (5-7). In Iran, limited studies have been conducted in this regard and some studies have reported high prevalence PF in Iran, but almost all of these studies have been retrospective and evaluated the prevalence of this disease in a specific province (5, 6, 8). Considering the cultural diversity that exist in different parts of Iran, there is no accurate picture of this disease in Iran.

For this reason and considering the limited studies in this field in Iran, and long-term complications, as well as the dif-

*Corresponding Author: Jalil Hosseini; Address: Men's Health and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Phone: (+98)21-22712234, Email: jhosseinee@gmail.com.



ferent causes of this disease, we decided to evaluate the overall incidence of this disease in Iran in a prospective study. In this study, we also examined the causes and symptoms, as well as the type of treatment physicians choose, so that in the future, we can use this data to educate physicians and other people in the community about this disease.

2. Materials and Methods

In this prospective, cross-sectional study, all urologists from Iran were first contacted and informed about this project and they were invited to cooperate. Then a pre-prepared questionnaire containing the required information including the demographic information of patients, signs and symptoms of the disease, diagnostic and therapeutic approaches of urologists including the type of suture used and the suturing method, intraoperative findings such as the location and length of injury, bilateral or unilateral injury, simultaneous damage to the urethra, etc. was provided to them and they were asked to complete and send this form in case of encountering a patient with a PF from February 2017 to February 2018. The Ethical Committee of Shahid Beheshti University of Medical Sciences approved the study. (IR.SBMU.RETECH.REC.1397.275)

Then, every two weeks, we contacted the urologists through email, phone calls, virtual networks, etc., and all forms and information of patients were collected. At the end of one year, all collected data were analyzed using SPSS software, version 19. Quantitative data were shown using mean and standard deviation. Chi-square test was used to evaluate significance of qualitative data and $P < 0.05$ was considered statistically significance level. The incidence of PF was calculated separately for each province per 100,000 men aged 20-75 years with age ranges of five years.

3. Results

During the study period, data of 531 patients with PF were collected, of which 26 (4.9%) had a history of PF, 237 (44.6%) had no history, and 268 (50.5%) had missing data (not giving a history by the patient or failure to complete the questionnaire by the relevant physician). The mean \pm SD age of the patients was 34.72 \pm 8.97 years.

The most common cause of PF in Iran was related to pressure during sexual intercourse with 64.8%, followed by non-sexual pressure and trauma (lying down in bed) with 16.9%, followed by masturbation (13.4%). In all provinces, sexual intercourse was the most common cause of PF except for Kermanshah province, which accounted for 77.1% of cases of non-sexual pressure and trauma (Taqandan).

The incidence of PF following sexual intercourse in the age range of 30-39 years was significantly higher than other age groups (44.5%), while the age group of 20-29 years had the

highest incidence of PF due to non-sexual pressure and trauma (38.6%) and masturbation (42.4%) ($P < 0.05$).

84% of patients present with triad of pain, swelling and hematoma of penis. 84% of patients had been visited by a physician within the first 24 hours after the trauma. However, in Gilan, Yazd and Alborz provinces, 66.7%, 40% and 37.5% of patients had been diagnosed and treated after 24 hours, respectively. 83.6% of the patients were treated without any radiological modality and only on the basis of history and physical examination. But more than 40% of patients in Tehran and Markazi provinces underwent ultrasound by urologists to prove their diagnosis.

79.5% of urologists in the country believed in emergency surgical treatment of such patients and 19.8% of physicians believed in delayed surgical treatment and only 0.8% choose conservative management. However, these percentages in Yazd (80%), Hamedan, Sistan and Baluchestan (66.7%) and Qazvin (54.5%) provinces were in favor of delayed surgical treatment.

94.9% of patients underwent surgery and the mean \pm SD length of tunica injury was 13 \pm 5.8 mm and in 95.1% of patients crural injury was unilateral. In 92.8% of the patients who underwent surgery, absorbable sutures were used to repair the defect. However, in Lorestan, Gilan and Qom provinces, almost one third of the patients were treated with non-absorbable sutures, which increases the risk of plaque formation at the operation site and touching the suture knot through the skin in the patients.

31 (5.8%) patients had urethral injury. This urethral injury had a significant relationship with the length of tunica defect and the unilateral or bilateral nature of injury, so that in ruptures greater than 20 mm and bilateral crural injury, the probability of urethral injury was significantly higher ($P < 0.05$); but no association was observed between the cause of PF and urethral rupture.

The incidence of PF in the country was 2.5 per 100,000 men in the age range of 20 to 75 years. Kermanshah (6.4), Ardabil (6.2), Kohgiluyeh and Boyer-Ahmad (6) provinces had the highest and Hamedan (0.5), Gilan (0.4), and Kurdistan (0.2) provinces had lowest PF incidence, respectively (figure 1).

The age ranges of 30-34, 40-44 and 25-29 years had the highest incidence rate (3.9, 3.5 and 3.3 per 100,000 men, respectively). Table 1 shows the incidence of PF and the number of reported cases by age groups and provinces of Iran.

4. Discussion

PF is one of the urological emergencies that requires rapid diagnosis and treatment (9). Despite proper and timely treatment of this problem, a number of patients suffer from complications such as chronic penile pain, plaque formation on

the penis and penile chordee that affect their quality of life (10).

PF is one of the rare urological diseases, especially in Western countries, whose prevalence was estimated to be 1 in 175,000 patients referred to the urological emergency department in the United States in 1996 (11). Another study reported only 137 patients over a seven-year period in seven European academic medical centers (12), but according to studies, this problem seems to be more common in Middle Eastern countries. For example, a review of PF in the Middle East and Central Asia (Turkey, Egypt, Iran, Tunisia, India, Qatar, and Bangladesh) reported 1,629 patients over 10 years in these areas (13), but the prevalence of PF is also different in different geographical regions of Iran (5-7).

The most reported cases of PF in Iran are related to a retrospective study in 2009, which reported 373 patients in Kermanshah during nine years, 76% of which developed PF because of Taqandan (14). In a retrospective study in 2017, the incidence of this disease in Iran was estimated to be 1.1-10.4 per 100,000 male population (3), but our study estimated the incidence of PF in Iran to be 0.2-6.4 (mean 2.5) per 100,000 male population, which is considerably lower than previous reports, indicating that previous studies have failed to provide an accurate picture of this disease in Iran. One possible reason for this discrepancy is that all previous studies have been retrospective. So, this factor can make it difficult to access some information of patients, which the current study has tried to eliminate this pitfall as much as possible.

Our study, like other studies in Iran and other parts of the world, showed that in many provinces of Iran the most common cause of PF is sexual intercourse (3, 4, 15), but in some provinces of Iran, especially western provinces such as Kermanshah, Ilam and Lorestan Non-sexual trauma has been more common, especially in Kermanshah province, where 77.1% of patients had PF due to Taqandan, which could be due to different cultures and lack of awareness of people in that area.

According to previous studies, men in the age group of 30-40 years had the highest rate of PF (8, 16, 17). In our study, the mean±SD age of patients was 34.7±8.9 years, which is similar to other studies. This study showed that the age range of 30-34 years, 40-44 years and 25-29 years had the highest rate of PF (3.9, 3.5 and 3.3 per 100,000 men, respectively). These age groups are a good target for sex education and increasing sexual awareness to reduce this problem. We also showed that the most common cause of PF varies in different age groups, for example, sexual intercourse was significantly higher in the 30-39 age group (44.5%), while in the age group of 20-29 years, masturbation was the cause of PF in 42.4% of patients, so we should consider this point in our training programs.

Most urologists believe that emergency surgical treatment

of PF reduces complications and length of hospital stay (2, 18, 19). For example, researchers have compared the long-term results of surgical and conservative treatment of PF. They showed that 50% of the patients who were managed conservatively had erectile dysfunction during the 20-month follow-up, while this percent was only 4 for patients who underwent surgery, so they recommended surgery as soon as possible (20). This study showed that about 80% of urologists in the country believe in emergency surgery for these patients, but in some provinces, including Yazd, Hamedan and Sistan and Baluchestan, more than 60% of patients underwent delayed treatment, which can cause complications. Therefore, physicians in those areas are a good target for education and raising their scientific level to reduce this problem.

Urologists use both non-absorbable sutures (21, 22) and absorbable sutures (23, 24) to repair tunica albuginea, and no studies have been performed to compare these methods (2) but Assmy and colleagues showed that the use of non-absorbable sutures significantly increased the likelihood of scar formation (25). It seems that the use of non-absorbable sutures can cause complications such as touching the knots under the penile skin, which can cause discomfort during intercourse or may increase the risk of plaque formation (26). AUA guidelines recommended absorbable yarn for repairing tunica albuginea (27). In our study, 92.8% of patients were repaired with absorbable sutures, but in Lorestan, Gilan and Qom provinces, about one third of patients underwent surgery with non-absorbable sutures, so teaching this point to the urologists in these areas is recommended.

Urethral injury is a rare but severe complication of PF (28, 29) and urethral bleeding is a good indicator for diagnosis, but the absence of bleeding does not rule out the possibility of urethral injury (2). There are no data in previous studies on possible intraoperative findings that may be associated with urethral injury in patients with PF, but we found a significant association between urethral injury with concomitant bilateral crural injury and the length of tunica injury more than 20 mm ($P<0.05$), which has not been considered in any previous study.

One of the possible limitations of this study was that there was a possibility of lack of cooperation of some urologists. For this purpose, we contacted all urologists every two weeks and obtained the necessary information.

5. Conclusion

This study showed that due to the cultural diversity of Iran, the rate of PF is very different in different parts of Iran, but its rate is much lower than previous studies. Urologists in some parts of Iran also need to be retrained on how to repair a PF to reduce the complications of the disease by choosing



an appropriate surgical procedure. Also, giving the necessary training to pre-defined target groups of men can be reducing PF prevalence.

6. Appendix

6.1. Acknowledgment

None.

6.2. Conflict of interest

None.

6.3. Funding support

None.

6.4. Author's contributions

The authors declare that they have no competing interests.

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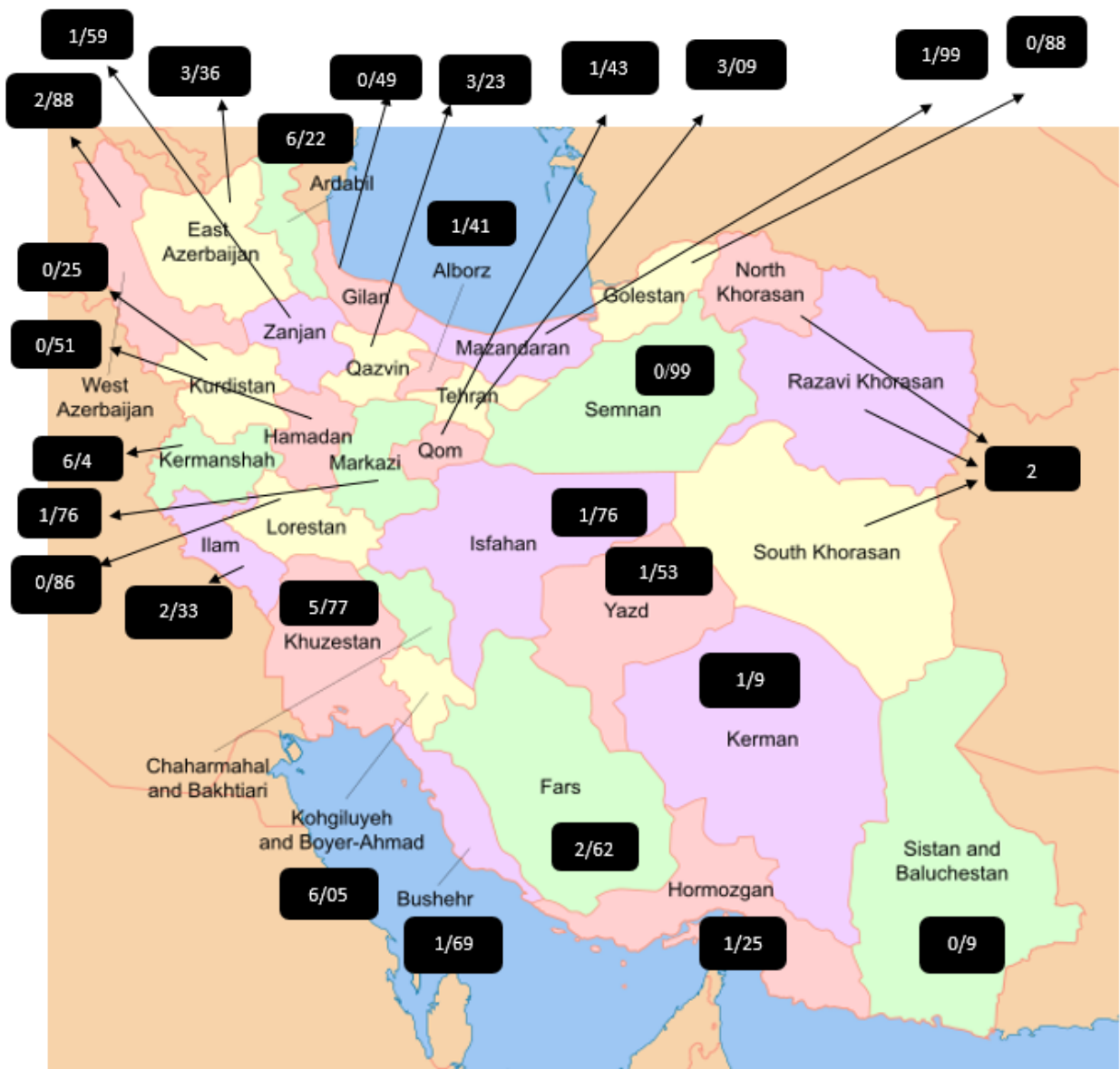


Figure 1: Incidence of penile fractures in Iran by provinces per 100,000 men in the age range of 20 to 75 years.

Table 1: The incidence of penile fractures and the number of reported cases by age groups and provinces

Age groups	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		>=65		Total Num.	Total incidence
	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence	Num.	Incidence		
Kerman	0	0.00	2	2.02	2	1.95	4	4.78	1	1.63	3	5.72	0	0.00	0	0.00	0	0.00	0	0.00	12	1.90
Khorasan	1	0.46	7	2.44	11	3.60	2	0.80	4	2.10	5	16.54	4	3.01	0	0.00	1	1.24	0	0.00	35	2.00
Tehran	17	3.89	30	4.91	37	5.15	21	3.45	19	4.04	8	1.87	2	0.55	5	1.68	1	0.43	2	0.46	142	3.09
Kermanshah	2	3.29	6	7.60	9	11.05	7	11.21	6	11.53	2	4.12	2	5.12	0	0.00	0	0.00	0	0.00	34	6.48
West Azerbaijan	3	3.49	3	2.79	9	8.29	2	2.13	3	4.07	1	1.42	0	0.00	0	0.00	0	0.00	0	0.00	21	2.88
Khuzestan	9	6.02	14	7.32	13	6.49	14	8.98	10	8.43	5	4.82	2	2.48	1	1.47	1	1.99	0	0.00	69	5.77
Fars	7	5.31	7	3.87	6	3.02	6	3.86	2	1.71	2	1.86	1	1.11	0	0.00	1	1.69	0	0.00	32	2.62
Isfahan	1	0.62	6	2.66	7	2.73	6	2.88	6	3.56	3	1.94	0	0.00	0	0.00	0	0.00	0	0.00	29	1.76
Qom	0	0.00	1	1.51	3	4.38	1	1.80	0	0.00	1	2.79	0	0.00	0	0.00	0	0.00	0	0.00	6	1.43
Hormozgan	1	2.43	0	0.00	1	1.63	1	2.09	0	0.00	1	4.02	0	0.00	0	0.00	0	0.00	0	0.00	4	1.25
Kohgiluyeh & Boyer-Ahmad	0	0.00	3	13.18	3	13.56	2	11.76	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	8	6.05
Alborz	2	2.24	3	2.33	3	1.99	1	0.77	0	0.00	2	2.32	1	1.48	1	1.79	0	0.00	0	0.00	13	1.41
Bushehr	0	0.00	1	1.98	2	3.65	1	2.32	1	3.31	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	5	1.69
Semnan	0	0.00	0	0.00	0	0.00	1	4.11	1	5.24	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.99
Ardebil	1	2.83	5	10.96	7	15.03	2	4.95	2	6.10	1	3.30	0	0.00	0	0.00	1	8.84	0	0.00	19	6.22
Golestan	1	2.61	0	0.00	1	1.89	0	0.00	0	0.00	0	0.00	1	3.71	0	0.00	0	0.00	0	0.00	3	0.88
Mazandaran	0	0.00	0	0.00	2	1.82	4	4.58	4	5.62	2	2.92	2	3.40	0	0.00	0	0.00	0	0.00	14	1.99
Markazi	1	2.41	0	0.00	0	0.00	4	7.68	1	2.31	0	0.00	1	3.20	0	0.00	0	0.00	0	0.00	7	1.76
Sistan & Baluchestan	0	0.00	1	3.25	1	1.60	0	0.00	1	2.93	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	0.90
Gilan	0	0.00	2	2.68	0	0.00	1	1.38	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	0.49
Hamedan	0	0.00	0	0.00	1	1.68	1	2.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.51
Qazvin	3	8.50	3	5.88	1	1.74	0	0.00	1	2.60	0	0.00	0	0.00	1	5.31	2	15.35	0	0.00	11	3.23
Lorestan	0	0.00	1	1.66	1	1.64	0	0.00	0	0.00	0	0.00	1	3.76	0	0.00	0	0.00	0	0.00	3	0.86
East Azerbaijan	2	2.03	4	3.05	5	3.38	7	5.27	8	7.31	4	4.09	3	3.76	1	1.49	0	0.00	0	0.00	34	3.36
Kurdistan	0	0.00	0	0.00	1	1.56	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.25
Ilam	0	0.00	0	0.00	1	4.35	0	0.00	3	20.47	1	0.76	1	12.06	0	0.00	0	0.00	0	0.00	6	2.33
Yazd	0	0.00	1	2.10	1	1.80	2	4.59	1	3.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	5	1.53
Zanjan	0	0.00	0	0.00	3	7.47	1	2.92	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	4	1.59
Total	51	2.32	100	3.38	131	3.98	91	3.36	74	3.50	41	2.19	21	1.37	9	0.70	7	0.73	2	0.11	527	2.56

*Incidence per 100,000 male population in the specified age range in each province.

**Incidence per 100,000 male population in the age range of 20-75 years in each province.

