



Quality of life in patients undergoing pelvic ring fracture surgery

Calidad de vida en pacientes operados de lesiones del anillo pélvico

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Abstract

Introduction: The pelvic ring fractures caused by high-energy trauma are serious injuries with many consequences such as post-traumatic pelvic pain, difficulty walking and sitting, as well as neurological, vascular and/or urological injuries that impact significantly negatively in the patient's quality of life. **Objective:** The purpose of this study was to evaluate the quality of life in patients undergoing pelvic ring fracture surgery using the Majeed pelvic score (MPS). **Material and methods:** From a specialized trauma center 82 patients with pelvic ring fractures who were surgically treated between January 2018 and June 2020 were included in this study. By a face-to-face or telephone conducted survey all patients were evaluated using the MPS. **Results:** The mean score in the MPS was 83.34 (Standard deviation 16.15). From the 82 patients, 18.3% reported sexual disturbances, 23.2% were able to return to their same job, only 17% of all patients scored the maximum of 100 points in the MPS. **Conclusions:** The quality of life of patients who have undergone surgery after suffering a pelvic fracture worsens significantly. We recommend a narrowing follow up to all patients, aim to find the discomforts and a tailored rehabilitation program.

Keywords: Pelvic ring, fracture, quality of life, orthopedic surgery, fracture sequelae.

Resumen

Introducción: Las lesiones del anillo pélvico son causadas por mecanismos de trauma de alta liberación de energía con secuelas importantes como dolor postraumático, dificultad para la marcha o para estar en posición sedente, así como lesiones neurológicas, vasculares o urológicas que impactan negativamente y de manera significativa en la calidad de vida del paciente. **Objetivo:** El propósito de este estudio fue evaluar la calidad de vida en pacientes intervenidos quirúrgicamente de lesiones del anillo pélvico utilizando el Majeed Pelvic Score (MPS). **Material y métodos:** En un centro especializado de trauma, 82 pacientes con lesiones del anillo pélvico que fueron tratados entre enero del 2018 y junio del 2020 fueron incluidos en el estudio. Mediante una consulta presencial o vía telefónica se realizó una encuesta utilizando la escala MPS. **Resultados:** El promedio de la calificación en la escala MPS fue de 83.34 (desviación estándar de 16.15). De 82 pacientes evaluados, 18.3% reportaron alteraciones en la función sexual, 23.2% pudieron regresar a realizar a su mismo trabajo y actividad, sólo 17% de los pacientes calificaron con 100 puntos en la escala de MPS. **Conclusiones:** La calidad de vida en pacientes a quienes se les realizó una cirugía por una lesión traumática del anillo pélvico, empeora significativamente. Recomendamos un seguimiento estrecho de todos los pacientes, con la finalidad de identificar las secuelas y ofrecer un programa de rehabilitación adaptado a cada paciente.

Palabras clave: Anillo pélvico, fractura, calidad de vida, cirugía ortopédica, secuelas de fractura.

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Introduction

The pelvic ring fractures that require surgery are serious injuries frequently caused by high-energy trauma and often associated with other injuries. In the patients there is considerable morbidity not only due to the pelvic injury itself, but also due to associated vascular, neurological, and urological injuries.¹⁻³ In the therapeutical management the surgery goal is aimed to restore harmony and stability of the pelvis as these injuries can have long-term consequences on the overall health and quality of life of the patients¹⁻³ which increases health care expenses and reduces a patient's working days.

The main purpose of this study is to provide an overview of the quality of life of patients who underwent at least one surgery after having suffered some pelvic ring fracture.

Material and methods

Patients were recruited during the period of January 2018 to June 2020 from a trauma specialized center the study design was a cross-sectional type, evaluated and approved by the institution's research committee (register number R-2020-1301-182). For the different types of pelvic ring fractures was used the Tile classification, the pelvic score of Majeed (MPS) was used to evaluate the quality of life, since this being the most widely used instrument in most studies.³⁻⁶ The inclusion criteria were age between 18 and 80 years, voluntarily participate in the study, being lucid with regards to time, space, and self, with the ability to communicate fluently, for both genders, being able to respond to at least one of three-call attempts, agreement with the informed consent. The exclusion criteria include hospitalized patients at the time of the study, having hearing loss or severe cognitive impairment, and patients who did not want to participate in the study, it was keep all the confidentiality and consent from all the patients at the moment of the study. The patients were interviewed for socio-demographic (age and gender) and clinical information (fracture type, date of accident, date of surgery, presence of associated injuries and presence of urological injury), which was corroborated with the review of clinical records (*Table 1*). Informed consent was processed, and the questionnaire was given, which provided the data of that follow-up moment. The MPS was applied to each patient to obtain information about their quality of life.

The age variable was stratified for analysis. The first group being under 30 years, the second group aged 31-55 and the third group over 55 years.

The Majeed Pelvic Score (MPS) was the instrument for evaluating function after major pelvic injury. It has been a commonly reported score for patients used in published articles. It is a single questionnaire that measures five functions: pain (30 points), work (20 points), sitting (10 points), sexual relations (4 points), help with ambulation, ambulation, and distance walked (12 points) for a total of 100 possible points. Scores range from 0 to 100, with zero representing the highest disability and 100 the best function. This provides score ranges to rank patient results into excellent, good, fair, and poor; weighted by the state of work.⁴⁻¹⁰

Quantitative variables were described by mean and median or standard deviation or range according to variable normality. Categorical variables were described by frequency and percentages. MPS dimensions were dichotomized into «no problems» (maximum score) and «problems» in order to establish a risk relationship. For the analysis, a «p» with a value less than 0.05 was considered statistically significant. The statistical package used was IBM SPSS Statistics version 25.

Results

During the period of recruitment, the number of 123 patients was screening, of which 82 meet the inclusion criteria, 6 died during hospitalization, 12 received conservative treatment, and 23 patients failed to meet the inclusion criteria. We had two study groups: less than 6 months and more than 6 months after surgery. For the first group (27% of cases), the MPS was applied during their post-surgical control appointment with prior informed consent. The remaining 73% was via phone after more than 6 months of the surgery.

In relation the demographic data, the average age was 37 years (standard deviation 15.11 years), with the most common age group (44%) being 31-55 year. From the total patients 54 (65.9%) were males and 28 (34.1%) were females.

In relation with the clinical characteristics data, five patients present with a Tile A fracture, 29 with Tile B and 48 with Tile C-type, fractures met the inclusion criteria and were interviewed for an 86% response rate within the group of survivors. *Table 1* shows the characteristics of patients with different Tile fractures.

From the total population studied, 89% had some type of associated injury, only 45.1% suffered some

Table 1: Sociodemographic and clinical characteristics.

	Tile A (N = 5)	Tile B (N = 29)	Tile C (N = 48)	Total (N = 82)
Age	44	32	39	37 ± 15.11
Male, n (%)	3 (60)	16 (55.17)	35 (72.9)	54 (65.8)
Female, n (%)	2 (40)	13 (44.83)	13 (27.1)	28 (34.2)

type of associated extremity fracture, followed by head trauma (HT) in 14.6% (either mild, moderate, or severe). There was a urogenital injury in 4.9% of cases. In the *Figure 1* illustrates the relationship between the type of fracture and the type of associated injury, where it is observed that for stable fractures of type A, 80% had an associated injury in an extremity and 20% suffered HT. For type B fractures, 8.3% suffered HT, 4.2% spinal cord trauma (SCT), 58.3% some trauma to the extremities, 12.5% thorax trauma, 8.3% abdominal trauma, 4.2% some type of urogenital trauma and 4.2% some other type of injury. For type C fractures, 20.5% suffered head trauma, 6.8% SCT, 43.2% extremity trauma, 9.1% thorax trauma, 6.8% abdominal trauma, 6.8% some type of urogenital trauma and 6.8% some other type of injuries such as a skin injury or Morel Lavalle injury.

The MPSs are listed in (*Table 2*). All 82 patients completed the MPS. The average MPS score was 83.34 (SD 16.15 pts). From the 82 patients, 19 patients (nearly 23%) reported sexual problems (less than 4 points in MPS). The return to the same job (at least 16 points) was reported in 80% of patients with type A fractures, 46% with type B fractures and 29% with Tile C fractures. Only 17% of patients scored a maximum of 100 points in MPS, including 40% of patients with type A fracture, 34.5% of type B fractures, and only 6.9% of type C fractures. Is remarkable that 13% (11 patients) did not respond the sex variable.

From the patients with Tile A type fracture, none developed any pain in relation to their fracture after surgery or problems in their sexual relations or any discomfort in sitting. In patients with type B fractures, the average score of all dimensions was good. In patients with type C fractures, the average pain dimension score was 25.5 points, for the work dimension, it was 10.1 points, the sitting dimension 9.04 points, the sexual relations dimension 3.4 points, the help with ambulation dimension 10.8 points, the ambulation dimension 10.2 points and the distance walked dimension 10.5 points (*Table 3*).

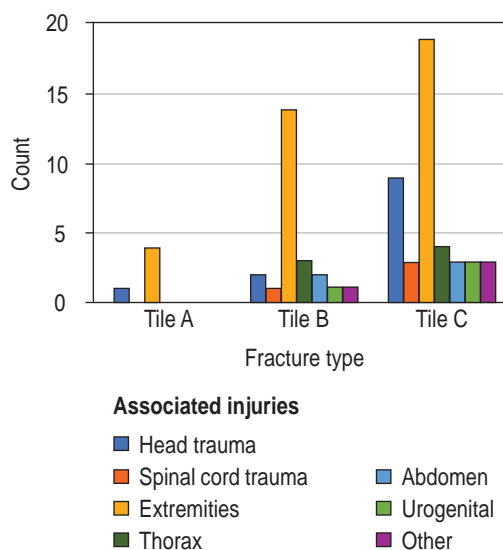


Figure 1: Relationship between the type of fracture and the associated injury.

From the 82 patients 63.4% had no pain, mild or occasional pain, however 18.3% presents intermediated pain and allowed them to do normal activities. In relation with the activity and pain for 11% pain appeared with moderate activity and disappeared when resting, 6.1% manifested tolerable pain (but limited activity), only 1.2% had severe pain when performing an activity. None of the patients surveyed manifested intense pain that continued at rest.

In relation with pain and work activity, from the 82 patients 23.2% of patients returned to their previous workplace and had the same performance. Only 14.6% had the same work (but their performance was reduced), 18.3% changed work, 8.5% worked light work and 35.4% did not return to work.

In relation with the activity of sitting, 74.4% of patients had no pain when sitting, while 17.1% had discomfort and 8.5% say it is uncomfortable or painful only if sitting is prolonged.

In relation with the sexual activity and discomfort, 63.4% of patients reported no discomfort or pain during sex, 18.3% felt some discomfort, 2.4% had discomfort

or pain only with prolonged sex and 2.4% reported feeling pain from the onset of sexual intercourse.

From the 82 patients, 81.7% of patients surveyed did not use walking aid, 6.1% used a cane, 4.9% used a walker, 3.7% used crutches, 2.4% used a wheelchair and 1.2% were bedridden, only 63% of patients walked unaided, 24.4% had a mild limp, 3.7% a moderate limp, 3.7% a significant limp, 2.4% took small steps dragging their feet and 2.4% could not walk. During the evaluation of the walk 76.8% of

patients could walk a normal distance for their age or general condition, 9.8% reported walking 1 hour without crutches and having mild pain and limping, 3.7% were limited with crutches, 3.7% with very limited time and distance and 2.4% were bedridden or performed small steps.

We perform an association of variables considering only the unstable fractures (Tile B + Tile C) to estimate the risk of the different dimensions. A significant difference in the pain dimension was found, with an

Table 2: Majeed pelvic score. N = 82.

Dimension	Description	Score	Tile A, (N = 5) %	Tile B, (N = 29) %	Tile C, (N = 48) %
Pain	Intense, continuous at rest	5	0	0	0
	Intense with activity	10	0	0	2
	Tolerable, but limits activity	15	0	3	8
	With moderate activity, it disappears when resting	20	0	0	19
	Intermediate, does activities	25	0	21	19
	Occasional, mild, or pain-free	30	100	76	52
Work	No regular work	4	0	34	40
	Light work	8	0	3	12
	Change of work	12	20	17	19
	Same work, reduced performance	16	20	17	12
	Same work, same performance	20	60	29	17
Sitting	Painful	4	0	0	0
	Uncomfortable or painful if prolonged	6	0	0	14
	Uncomfortable	8	0	14	21
Sexual relations	No pain	10	100	86	65
	Painful	1	0	0	5
	Uncomfortable or painful if prolonged	2	0	0	5
	Uncomfortable	3	0	11	30
Help with ambulation	No pain	4	100	89	60
	Bedridden	2	0	3	0
	Wheelchair	4	0	0	4
	Two crutches	6	20	0	4
	Walker	8	0	0	6
	Walking stick	10	0	0	13
	None	12	80	97	73
Ambulation	Cannot walk	2	0	3	2
	Small steps dragging feet	4	0	0	4
	Significant limp	6	0	0	6
	Moderate limp	8	0	3	4
	Mild limp	10	20	10	34
	Normal	12	80	84	50
Distance walked	Bedridden, small steps	2	0	3	2
	Very limited time and distance	4	0	3	5
	Limited with crutches	6	0	0	6
	An hour on crutches, limited without crutches	8	0	0	6
	An hour without crutches, mild pain, or limp	10	20	0	17
	Normal for age or general condition	12	80	84	64

Table 3: Score averages based on fracture type.

	Tile B	Tile C	Tile A
Pain	28.4 ± 3.3	25.5 ± 5.5	30 ± 0.0
Work	12 ± 6.6	10.1 ± 6.1	17.6 ± 3.5
Sitting	9.7 ± 0.7	9.04 ± 1.4	10 ± 0.0
Sexual relations	3.8 ± 0.3	3.4 ± 0.8	4 ± 0.0
Help with ambulation	11.6 ± 1.8	10.8 ± 2.1	10.8 ± 2.6
Ambulation	11.3 ± 2.0	10.2 ± 2.4	11.6 ± 0.89
Distance walked	11.3 ± 2.3	10.5 ± 2.5	11.6 ± 0.89

OR of 0.29 (CI 95%: 0.10-0.81), p = 0.01, in patients with significantly higher type B fracture than patients with a type C injury. Similar results were obtained with the dimensions for sitting, sexual relations, help with ambulation, ambulation and distance walked. There was no significant difference in the work dimension (Table 4).

From the total of 82 patients no differences were found in variables such as age, gender, and presence of associated injuries compared with other reports in the literature, Oliver et al. described in their study of a cohort 35/55 (64%) for their study.⁵ The age in our study group is equivalent to most reported studies, with the average age of our patients being 38 years.¹¹⁻¹⁵ We agree with most published series in that there are much more frequent fractures in males.^{16,17} Although our incidence is somewhat lower (65.8%), most studies show an incidence of about 75% in males, these can be related to the size of the sample.

The type of fracture presented by the patients was type A at 6%, type B at 35.5% and type C at 58.5%, according to the type of patients receiving care at our institution, this being a reference center, when we compare to the reported literature there is no differences.

The quality of life before the injury is unknown. In some studies that included less serious injuries, patients have been asked to make a retrospective assessment of their quality of life prior to the injury.^{18,19} In our study with patients with serious injuries, we decided not to include such retrospective evaluation due to the potential risk of patients overestimating or underestimating their pre-injury quality of life. There are some differences in functional results and quality of life between patients with type B and type C fractures. In our study, there were significant differences in pain. Though it is absent or very mild in 63.4% of patients, the risk of pain increases almost three folds if the patient

suffered a type C fracture. Likewise, Brouwers et al.¹ reported the quality of life in patients with pelvic ring fractures in the short and medium-term. They found, just like us, that the pain increased in patients with a Tile C injury and significantly lower MPS were observed in patients with a Tile C fracture than in patients with Tile A and B fractures. Significant differences were found in 5 other dimensions: sitting, sexual relations, help with ambulation, ambulation and distance walked. Patients with type B fracture scored significantly better than those with Tile C fractures, while there were no significant differences between patients in the working dimension when we expected that in greater proportion, patients with type B fracture would return to the same workplace for having higher quality-of-life scores than those with type C fractures. We observed that 55% of patients surveyed with type B fracture did not return to work in their previous workplace.^{18,19}

About 80% of the patients surveyed said they have no discomfort or pain when sitting, which is a dimension with excellent results regardless of the type of fracture. More than 80% of patients walking again do so without any aid, but about 40% do so with difficulty or some degree of limp. Although the same 80% can travel a normal distance for their general condition (age and physical conditions).

The type of fracture, as well as the presence or absence of any associated injury, especially a neurological or urogenital injury that causes sexual dysfunction, could influence the functional outcome and quality of life.⁷ The prevalence of urogenital

Table 4: Association measures.

MPS	OR [95% IC]	p
Pain	0.29 [0.10-0.81]	0.01
Tile B-Tile C		
Work	0.52 [0.17-1.5]	0.25
Tile B-Tile C		
Sitting	0.29 [0.08-0.97]	0.03
Tile B-Tile C		
Sexual relations	0.16 [0.04-0.64]	0.005
Tile B-Tile C		
Help with ambulation	0.09 [0.01-0.78]	0.01
Tile B-Tile C		
Ambulation	0.20 [0.06-0.63]	0.006
Tile B-Tile C		
Distance walked	0.14 [0.03-0.70]	0.01
Tile B-Tile C		

MPS = Pelvic score of Majeed.

disorders was low (4.9%). However, almost 26.7% of all patients reported problems in the sexual relations dimension. One possible explanation could be that sexual complaints are not reported by patients during follow-up and even in our study, 13.4% of patients did not record any response, perhaps due to the sensitive nature of such problems. Harvey-Kelly⁸ reported a higher percentage of patients (28%) who refused to complete the sexual questionnaires. Another explanation might be that although there is no obvious injury to the urogenital system, the lumbosacral plexus is injured and can cause serious problems.

Most studies report lower quality values in patients with pelvic ring fracture than in the normal population. The average MPS in our study was high compared to the studies of Suzuki⁷ and Van den Bosch⁹ (83.34 vs 79.7 and 78.6, respectively).

Follow-up periods in previous studies were longer than in our study, and still resulted in similar or even better results, but we observed a maximum MPS in only 17% of patients. Brouwers et al.¹ reported a maximum MPS of 31% of Tile A, 28% of Tile B and 0% of Tile C fracture patients, with a median follow-up period of 2.5 years. So, it would be important to follow-up on our patients in the long term. Lefaiivre et al.³ reported a maximum MPS in 18.4% of patients, with a median follow-up of 4.5 years. However, that study only included type B and C fractures. In our study, 100% of patients with Tile A fracture, 86% of patients with Tile B fracture and 60% of Tile C fracture patients were reported to be at the highest end of the MPS scale, equivalent to a good result (75 or more points).

Discussion

Our study has some limitations, especially the sample size, and specifically the group of patients with Tile A fractures as they are usually given conservative management and rarely have surgical indication 12-18, so this group of patients were not tested for variable association with the results of patients with type B and type C fractures, considering that their results were not statistically significant. We would have liked to perform an analysis of the three different types of fractures with respect to quality of life, but the subgroup of type A fractures was too small to perform a valid interpretation.

Thus, there is the possibility of selection bias. Of the total of 123 patients with pelvic fractures identified in the study period (30 months), only 82 patients

(66.6%) were finally included. This influenced the overall results. However, in the patients studied, no differences were found in variables such as age, gender, and presence of associated injuries. Oliver et al.⁵ described in their study of a cohort 35/55 (64%) for their study.

The age in our study group is equivalent to most reported studies, with the average age of our patients being 38.¹⁵

We agree with most published series in that they are much more frequent fractures in men.^{16,17} Although our incidence is somewhat lower 65.8%, most studies show an incidence of about 75% in men.

The type of fracture presented by the patients was type A at 6%, type B at 35.5% and type C at 58.5%, according to the type of patients receiving care at our institution, this being a reference center.

Quality of life before injury is unknown. In some studies that include less serious injuries, patients have been asked to make a retrospective assessment of their quality of life prior to the injury.¹⁹ In our study with patients with serious injuries, we decided not to include such retrospective evaluation due to the potential risk of overestimation or systemic underestimation of patients when assessing their pre-injury quality of life.

Conclusion

The quality of life of patients who have undergone surgery after suffering a pelvic fracture worsens significantly globally. Though the physical aspect is the one most affected, it should not be forgotten that the emotional and social aspects also play a very important role. Patients who have suffered a pelvic ring fracture usually have good quality-of-life results after six months. Unsurprisingly, the study showed that stable type A fractures would likely have the least impact on quality of life. Also, 52% of patients with type C fractures and 73% of patients with type B fractures were satisfied with their therapeutic results.

There was a close correlation between the type of fracture and the degree of pain, limitation of sitting and general condition for walking. Returning to work and specifically to the same work as prior to injury shows no correlation with fracture type. For the functional state when it comes to walking –aided or unaided– and distance walked, we observed that there is an improvement from six months after surgery, until achieving mostly independence to do so.

With these results, we can predict that patients are at risk of further functional impairment that can

affect their quality of life, so preventive measures in these cases should be applied. Long-term follow-up of patients with fractures, especially Tile B and Tile C, is justified.

Recommendations

We recommend the important role of involve other specialties during the course of rehabilitation to optimize the chances for the patients (with serious injuries) to improve their quality of life after surgery. At the physical therapy service, we must specify a rehabilitation plan that includes the use of orthosis to improve walking if required.

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Conflict of interests

This manuscript has not been published and is not under consideration for publication elsewhere. We have no conflict of interests to disclose, all authors are agree with the content of the manuscript and we respectfully ask that our article be reviewed, if you consider that the manuscript is appropriate for your journal, thanks for your consideration.