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Research Article

Long-Term Outcomes in Obese, Severely Obese, and Morbidly Obese Patients having Open Posterior Midline Sacroiliac Joint Fusions for Disabling and Dysfunctional Sacroiliac Joint Pain

***Corresponding Author: Bruce E Dall**
Associate Clinical Professor, Western Michigan University, School of Medicine, Kalamazoo, MI, USA
Email: Dall.bruce@yahoo.com

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Abstract...

Study Design: Retrospective

Objective: To present outcome data on obese patients having sacroiliac joint fusion surgery.

Background Data: There exists no data in the literature on the relationship between sacroiliac joint fusion surgery outcomes and BMI scores.

Methods: 37 consecutive obese, severe obese, and morbidly obese patients were identified and divided into two groups using the WHO classification for obesity. Class I, obese (BMI 30.0-34.9) was the obese group (OG), and Class II & III, severe and morbid obesity (BMI 35.0->40) was the (S&MOG). Each post-operative group was compared looking at complications and returns to surgery and long-term changes in pain relief, narcotic use, further surgeries required, functional ability, working status, cosmetic results, and overall satisfaction to include doing it again and recommending it. Greater than 62% of had one or multiple attempts at lumbosacral fusions, had their hardware removed, and were considered "failed backs". Most patients were on regular narcotics and disabled or retired. The surgery performed was the posterior midline fascial splitting approach.

Results: The average F/U for the OG was 41 mos. with no reported early or late complications. There were no further surgeries. Their VAS improved three points. 69% were off regular narcotics, and their satisfaction score was 77%. The average F/U for the S&MOG was 37 mos. with 2 minor medical complications and 4 returns to surgery for hardware issues and one non-union. Their VAS improved 2.5 points. 60% were off regular narcotics. Their satisfaction score was 87%.

Conclusion: Most of these patients on presentation were "failed backs". There were few complications with the S&MOG requiring more returns to surgery for hardware related issues. VAS was modestly reduced. Regular narcotic use was much less, and satisfaction scores were high. More research is needed.

Keywords: Sacroiliac joint; Fusion; Obesity; Morbid obesity; BMI; Complications; Surgery; Instrumentation; Infection; Non-union; Readmission.

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Purpose

To retrospectively evaluate the long-term outcomes of a posterior midline open SIJ fusion procedure in obese patients, and to observe differences in results when comparing Class I obesity with Classes II & III. To begin to develop a data base to determine the reasonable eligibility for obese patients to undergo open SIJ surgeries. To provide a trending moving base line of data for this patient population for comparing current lateral and posterior minimally invasive SIJ procedures performed under the FDA 510 (k) designation.

Introduction

The literature discussing outcomes of posterior spinal fusion procedures in obese patients is copious and demonstrates increased infections, wound complications, operative time, blood loss, readmissions, and re-hospitalizations [1-3]. The World Health Organization (WHO) currently defines obesity using the body mass index (BMI) in kg/m^2 as Class I, 30.0-34.9, as obese; Class II, 35.0-39.9, as severe; and Class III, 40.0 and greater, as morbid [4,5]. Sacroiliac Joint (SIJ) fusion surgery has increased significantly over the past decade and the number of surgical outcome studies published has increased accordingly [6,7]. Although it is assumed that many obese patients are undergoing this surgery, thus far no outcome studies for SIJ fusion surgery have looked specifically at the influence of the BMI in long-term outcomes. This paper evaluates long-term outcomes in obese patients undergoing posterior midline open SIJ fusion procedures occurring over a five-year period. This study provides new baseline data on obese SIJ fusion patients, which will need future revisions as this population of SIJ fusion patients is further studied and reported on, especially considering the current wave of lateral and posterior lateral minimally invasive FDA 510 (k) designated SIJ fusions being performed [7,8].

Materials and Methods

Thirty-seven consecutive patients were retrospectively identified as being obese and having a posterior midline SIJ fusion procedure during a five-year period by one surgeon at one hospital specializing in a team approach for SIJ pain and treatment. The Electronic Medical Record (EMR) was used to identify these patients and to further study them. All patients were diagnosed using the published "Algorithm for the Diagnosis and Treatment for Sacroiliac Joint Pain" [9], and each patient had one or more positive diagnostic injections establishing the SIJ(s) as a pain generator as well as further diagnostic injections for suspected lumbosacral pain generators. The surgery performed was the published posterior midline fascial splitting and open approach, which was further modified to be muscle sparing [10,11]. In surgery the entire Posterior Superior Iliac Spine (PSIS) was used as bone graft being placed into the dorsal SIJ. Post-surgery full weight bearing was allowed immediately, and the only bracing was the use of a lumbosacral corset (not useful in most due to size) and a walker for 12 weeks. All patients had X-Rays at 6 weeks, a CT scan at 12 weeks (repeated as needed) and X-Rays at one year. The hospital's investigational review board approved this retrospective study and provided ongoing oversight. By using the World Health Organization (WHO) BMI (kgs/m^2) guidelines [4,5]. 17 patients were identified as being obese, Class I (BMI 30.0-34.9) and were followed as the Obese Group (OG). Twenty patients were identified as having severe obesity, Class II (BMI 35.0-39.9) or morbid obesity, Class III (BMI 40.0 or greater) and were followed as the severe and morbidly obesity group (S&MOG). The follow-up process involved a questionnaire and combinations of office visit examinations and phone conversations. All data was compiled by an independent observer hired by the institution and having no conflicts of interest with the study's outcomes. Each post-operative group was evaluated separately and then compared looking at complications, further surgeries, pain relief, narcotic use, functional ability, working status, and overall satisfaction to include doing it again and recommending it to others. The VAS was utilized for a pain score, the amount one could lift without pain as a functional test, and a yes or no for satisfaction scores.

There were 4 in the OG (24%) and 5 in the S&MOG group (25%) who did not follow-up leaving 28/37 (76%) patients available for follow-up. As a result, it was felt that the results in this study should be viewed as trending in these group outcomes and no statistical analysis was attempted.

The pre-operative OG group demographics consisted of 13 patients with an average age of 52 years. There were 7 females and 6 males with an average BMI of 32. Only one patient was working with the rest either retired or disabled. This group had a total of 4 patients with 7 comorbidities (diabetes, heart disease). 8/13 (62%) had one or multiple previous LS fusion surgeries with 13 (100%) requiring further surgeries mainly for hardware removal. The average VAS in this group was 7.8/10 and 13 (100%) were on regular narcotics with 7/13 (54%) in chronic pain clinics. Their average time in conservative treatment was 36 months.

The pre-operative S&MOG group demographics consisted of 15 patients with an average age of 55 years. There were 11 females and 4 males with an average BMI of 39.1 (35.5-48.2). Only 5 patients were working with the rest either retired or disabled. This group had a total of 19 comorbidities in 15 patients, (diabetes, heart disease, and pulmonary disease). 11/15 (73%) had one or multiple previous LS fusion surgeries with one having had a previous SIJ fusion. There were 9 patients having complications from these fusions requiring further surgery with most having hardware removal. Their average VAS was 7.8/10 and 14 (93%) were on regular narcotics with 9 (60%) in chronic pain clinics. Their average time in conservative treatment was 43 months.

Results

Surgeries for each group with corresponding surgical data are found in Table 1.

The average f/u for the OG was 41 months. There were no early or late complications, and the only re-operations for any reason were in seven patients returning during the f/u period to have the contralateral SIJ fused using the same technique. The average VAS was 4.8 (38% decrease from pre-op). The group averaged lifting 10# without pain with 2 (15%) not working, 2 (15%) working and the others disabled or retired (70%). 5 (38%) were on regular narcotics, and 4 (31%) were in chronic pain clinics (Table 2). Satisfaction rates were high (Table 3).

The average f/u for the S&MOG was 37 months. Early com-

plications consisted of one UTI and one hemorrhage neither requiring surgery. During the f/u period 4 (27%) patients required a further surgery (2 loose screws, 1 broken screw, & 1 non-union). The average VAS was 5.3 (32% decrease from pre-op). One patient did return during the follow-up period to have their contralateral SIJ fused using the same technique. The group averaged lifting 15# without pain with 3 (20%) working full time and the others disabled or retired. 5 (33%) were on regular narcotics, and 4 (27%) were in chronic pain clinics (Table 2). Satisfaction rates were high (Table 3).

Table 1: Surgical data for OG and S&MOG patients.

	OG	S&MOG
# of patients	13	15
Unilateral SIJ fusions	12	12
Contralateral SIJ fusion*	7	1
Bilateral SIJ fusion	2	3
Total # SIJs fused	23	19
Concurrent LS fusions**	7	10
Post op complications	0	6
UTI		1
Hematoma		1
Screw breakage***		1
Loose screw***		2
Non-union***		1
Return to surgery	0	4

*Returned during the study period to have their contralateral SIJ fused using same surgical technique
**Performed through same posterior midline incision as SIJ fusion(s)
***Required return to surgery

Table 2: Comparison of pre and post operative narcotic and pain clinic use in OG and S&MOG.

	OG		S&MOG	
	Pre-op	post-op	Pre-op	post-op
Narcotics	100%	38% (-62%)	93%	33% (-60%)
Pain clinics	54%	31% (-23%)	60%	27% (-33%)

Table 3: Comparison of pre and post operative narcotic and pain clinic use in OG and S&MOG.

	OG	S&MOG
Satisfied	10 (77%)	13 (87%)
Would do again	11 (85%)	12 (80%)
Would recommend	12 (92%)	11 (73%)

Discussion

This is the first paper to discuss long-term outcomes in obese patients having open sacroiliac joint surgeries. The current vogue fusion surgery for the sacroiliac joint is the lateral minimally invasive fusion using devices that fall under the FDA 510(k) designation [7,8]. Although obese patients undoubtedly occupy the ranks of the tens of thousands of patients having had these surgeries, no study has looked specifically at the BMI for differences in outcomes. Classifications for obesity have been constantly changing with the most recent stating that a BMI (kg/m^2) from 30.0-34.9, Class I, was obese; 35.0-39.9, Class II, was severe; and 40.0 and above, Class III, was morbid [4,5]. At our institution it was felt that the minimally invasive lateral surgical options would not be satisfactory in these obese patients, so the posterior midline open approach was utilized in all our obese patients requiring this surgery. The posterior midline surgery used was first published over two decades ago and utilized fascial splitting and pedicle screw fixation [10]. It subsequently underwent modifications to spare muscle tissue which was published in 2015 [11]. This surgery provides excellent fixation allowing full weight bearing immediately post-surgery. The bracing protocol was a lumbosacral corset, if one could be fit, and a walker for 12 weeks. Some validation for this surgical technique was provided by the study itself as 8 patients returned during the study period to have the contralateral side fused using the same procedure.

There are many studies in the literature that discuss outcomes in obese patients having both short and long lumbosacral fusions [1-3]. These papers report increases in wound complications, infections, re-operations, and re-admissions. Our presenting patient population was considered especially challenging and complex as most patients had been in the medical system for long periods of time (years for many) seeking low back pain relief. Many had undergone multiple lumbar fusion attempts, were regularly taking narcotics, and in pain clinics. Most were not working, disabled, or retired. The majority were considered “failed surgical backs”. Our main referral source for these patients was from orthopedic and neurosurgeons. As a result of using our published Algorithm to diagnose and treat sacroiliac joint pain [9], the pain generators in the lumbosacral spine were also identified. This resulted in 17 patients having a simultaneous lumbosacral fusion repair or extension at the time of their SIJ fusion(s) based on extensive pre-operative diagnostics and planning.

The main success in both groups was a high satisfaction rate, especially in the S&MOG and a moderate reduction in pain and pain clinic use. There was a greater than 60% reduction in both the OG and S&MOG in the use of narcotics. There were only two post-operative medical complications in the S&MOG, which did not require further surgery, and none in the OG.

There were no returns to surgery in the OG except to have the contralateral side fused. In the S&MOG there were returns to surgery for loose and broken hardware and a non-union of the fusion. It could be argued that using only a walker and allowing full weight bearing post operatively in this group may have contributed to the failure of hardware and the non-union and thus returns to the operating room. Further study is needed in that regard. One patient in this group did return during the study period to have the contralateral SIJ fused using the same technique. Although both groups demonstrated some functional ability by lifting minimal weights without pain, there were no substantial differences in overall functional ability in either group at long-term follow-up. The majority of these patients pre-operatively were disabled and retired, which made achieving any changes in that status difficult post-operatively from a social economic viewpoint, despite less pain and high satisfaction rates. The lack of a more robust decrease in pain and increase in functionality was disappointing but having approximately 60% of the study patients using fewer regular narcotics and having a modest decrease in the need for pain clinics was encouraging in this “failed back” obese patient population.

The main strengths of this study were the Algorithm, which allowed finding all the significant pain generators in this diffi-

cult chronic pain population, and the type of surgical approach used, which allowed for ease of use in the obese patient, solid fixation, ability to extend surgery to lumbosacral spine when needed using the same incision, immediate full weight bearing post-op with minimal bracing, and low medical complication rates.

There are several significant weaknesses in this study. Being a retrospective study with one surgeon and one institution is a major weakness. There was a 76% patient response rate at long-term follow-up. Given that 24% did not respond it was decided to not perform statistical analysis but to look at trending in those who did respond. This makes any conclusions from this study no different than that from a large series of case studies. Since this is the first study to begin to analyze outcomes in obese patients having sacroiliac joint fusion surgery it seemed reasonable to share this data as we have it. We would like to have compared the obesity groups with those having normal BMIs, but that data is incomplete and therefore not available for this study.

Conclusion

Obese patients in this study were complex with many being "failed surgical backs". When all pain generators were identified and treated it resulted in high satisfaction and low return to surgery rates except for the severe and morbidly obese, who had more hardware failures resulting in further surgeries. All obese patients tolerated a posterior midline fascial splitting and muscle sparing open sacroiliac joint fusion procedure well with few complications. Greater than 60% of obese patients in both groups were no longer taking regular narcotics. There were no significant changes in functional or work activities in these patients at follow-up. More studies are needed on obese patients having sacroiliac joint fusion surgeries utilizing both open and the currently in vogue minimally invasive procedures.

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