Olle Hägg
Peter Fritzell
Anders Nordwall
The Swedish Lumbar Spine Study
Group

Sexual function in men and women after anterior surgery for chronic low back pain

Received: 14 February 2005
Revised: 14 July 2005
Accepted: 31 July 2005
Published online: 7 September 2005
© Springer-Verlag 2005

O. Hägg (✉) · P. Fritzell · A. Nordwall
Department of Orthopaedics, Sahlgrenska
University Hospital, 413 45 Göteborg, SE,
Sweden
E-mail: olle.hagg@vgregion.se
Tel.: +46-31-342-4435
Fax: +46-31-82-5599

O. Hägg · P. Fritzell · A. Nordwall
Department of Orthopaedics,
Falu Lasarett, Falun, Sweden

Abstract Sexual dysfunction after anterior lumbar fusion has mainly been focused on male biological function (retrograde ejaculation). The aim of the present study is to assess the effect of fusion surgery for chronic low back pain on the sex-related quality of life. Apart from routine prospective questionnaires, additional gender-specific mailed questionnaires produced retrospective data on sexual enjoyment and function after 2 years of follow-up. Patients randomised to non-surgical treatment and anterior or posterior fusion were compared. We found that surgically treated patients had a significantly better sex life than those non-surgically treated. The

improved sex life was significantly associated with the reduced back pain. The improvement after anterior fusion, however, was counteracted by a trend towards disturbed orgasm and genital sensation in women, and a significant disturbance of ejaculation and genital sensation in men. In view of the increased frequency of anterior lumbar surgery with the strong promotion of disc replacement, the findings in the present small retrospective pilot study should be tested in larger prospective trials.

Keywords Sexual dysfunction · Orgasm · Ejaculation · Spinal fusion · Low back pain

Introduction

Sexual dysfunction after anterior lumbar interbody fusion (ALIF) related to damage to the hypogastric nervous plexus has mainly focused on the male biological function, which has been reported as retrograde ejaculation, resulting in infertility.

The reported frequency of retrograde ejaculation varies largely. It ranges from zero [10, 11] through 2–10% [1–4, 9, 12–14, 16] to 16–28% [7, 8, 15]. There are also some indications that this complication is technique-dependent [7]. It appears to be more frequent with a transperitoneal/laparoscopic approach [7, 8, 14, 15] than with a retroperitoneal dissection [7, 9, 14, 16].

Less attention has been paid to the consequences of ALIF on sexual enjoyment in both men and women. We therefore undertook the present study, with the aim to

assess the overall effect on sexual function and to describe gender-specific complications.

Patients and methods

The Swedish Lumbar Spine Study [5] included 294 patients randomised to surgical or non-surgical treatment for chronic low back pain (CLBP). This study includes 264 patients who complied with randomisation and were followed up after 2 years. The mean age was 43 (SD 8.2) years, range 25–64 years, 97% below 60 years. Comorbidity was evenly distributed between treatment groups and no patient had obvious psychiatric disease or hip joint disease. There were 63 non-surgically treated patients. The surgical patients were operated with four different techniques: un-instrumented posterolateral fu-

sion (PLF, $n=68$), instrumented PLF ($n=62$), instrumented PLF+anterior interbody fusion (ALIF, $n=53$) and instrumented PLF+posterior interbody fusion (PLIF, $n=18$). Patients operated with PLF, PLF-I and PLIF were allocated to the “Posterior Fusion” (PF) group ($n=148$) and those treated with ALIF to the “Anterior Fusion” (AF) group ($n=53$).

All patients ($n=264$)

Back pain was estimated prospectively with the visual analogue scale (VAS; with data available for 62 non-surgical and 192 surgical patients).

Prospective data were also available from the Oswestry Disability Index (ODI; 57 non-surgical, 180 surgical patients) and the Zung Depression Scale (ZDS; 57 non-surgical, 188 surgical patients). The overall sexual function was estimated with item 8 of the ODI: “Sex life” with the following alternatives:

- My sex life is normal and causes no extra pain
- My sex life is normal but causes some extra pain
- My sex life is nearly normal but is very painful
- My sex life is severely restricted by pain
- My sex life is nearly absent because of pain
- Pain prevents any sex life at all

Sexual enjoyment was assessed with item number 6 of the ZDS: “I still enjoy sex”:

- A little of the time
- Some of the time
- Good part of the time
- Most of the time

In both scales, improvement (“Better”) and deterioration (“Worse”) were defined as at least a one step difference in positive/negative direction.

Fig. 1 Sexual function at 2 years FU in surgically and non-surgically treated patients ($P=0.004$, χ^2 -test)

Surgical patients ($n=169$)

All surgically treated patients received postal questionnaires immediately after the two years of follow-up, consisting of gender-specific questions related to details of sexual dysfunction (see Appendix). The questionnaires were completed and returned by 169 patients (84%): 58 women and 67 men in the PF group and 27 women and 17 men in the AF group. The AF was performed with retroperitoneal dissection in 39 cases and by the transperitoneal approach in 5 cases. The questions in the questionnaire were by definition retrospective.

Statistical methods

In the statistical analysis, categorical data were tested with Fisher's exact test or the χ^2 -test and continuous data with the Mann-Whitney U -test. We also performed multivariate logistic regression analyses separately for men and women who were surgically treated.

Results

All patients

Overall sexual function (item 8, ODI)

Patients treated surgically had a significantly better ($P=0.004$) sex life than those randomised to non-surgical treatment (Fig. 1). Women reported improved sexual function more frequently than men, 62 versus 44% ($P=0.04$). There was no significant difference in the frequency of improved sex life between anterior and posterior fusion.

Improved sex life was significantly associated with decreased back pain. The decrease was 30 (SD 27) VAS

Fig. 2 Sexual enjoyment at 2 years FU in surgically and non-surgically treated patients ($P=0.065$, χ^2 -test)

units among those improved, compared with 4 (SD 17) units among those with unchanged/worse sex life ($P<0.0001$).

Sexual enjoyment (item 6, ZDS)

There was a non-significant trend ($P=0.065$) towards improved sexual enjoyment when comparing surgically with non-surgically treated patients (Fig. 2). There were however, no significant differences between genders or between anterior and posterior fusion.

Improved sexual enjoyment was significantly associated with decreased back pain: 27 (SD 25) VAS units among those reporting improved sexual enjoyment compared with 11 (SD 24) units among those with unchanged/worse sexual enjoyment ($P<0.0001$).

Surgical patients

Specific sexual dysfunction

As illustrated in Fig. 3, women reported a disturbed orgasm and sensory change after both anterior and posterior fusion without significant differences.

The men (Fig. 4) reported a significantly more disturbed ejaculation (7/17=41% vs 7/66=11%, $P=0.003$) and sensory change (8/17=47% vs 8/66=12%, $P=0.001$) after anterior than after posterior fusion. Retrograde ejaculation was reported after both posterior (3/66=5%) and anterior (2/16=13%) fusion.

Multivariate analysis of sexual function

In gender separate logistic regression models, we tested the independent effect of the univariately analysed variables on the overall sexual function, as measured

with the ODI-item “Sex life” as the dependent variable. Thus, all gender-specific questions, surgical approach and change of back pain were included in the regression model.

For both men and women, we found that the only variable remaining as significantly associated with the improved sex life was the decreased back pain. The OR for women was 1.05 (CI 95%=1.024–1.080) and for men it was 1.05 (CI 95%=1.018–1.074), for each unit of change of back pain (VAS). The men showed a non-significant trend for the negative effect of AF on sex life ($P=0.08$), but it was not included in the final step of the regression model.

Discussion

The results of the present study indicate that sexual function improved in a majority of patients being surgically treated for CLBP. The improvement, which seems to be greater after surgical than after non-surgical treatment, appears to be independent of the surgical approach—the same effect was achieved whether anterior or posterior fusion was performed.

Assessed either as the overall sexual function (“My sex life”) or as sexual enjoyment (“I still enjoy sex”), improvement is strongly associated with the decreased back pain.

However, the beneficial effect of the surgically induced pain reduction may be counteracted by detrimental effects of the same treatment by neurological disturbance. It was somewhat unexpected that several of the gender-specific sexual dysfunctions were reported after both anterior and posterior fusion surgery. The retrospective nature of the questions makes data somewhat uncertain, but one cannot neglect the finding that approximately 20% of the women reported disturbed

Fig. 3 Sexual dysfunction in women related to surgical approach ($P=0.2-1.0$, Fisher's exact test)

Fig. 4 Sexual dysfunction in men related to surgical approach ($*P < 0.005$, Fisher's exact test)

orgasm and genital sensation. There were no significant differences between anterior and posterior surgery in female sexual dysfunction. However, the sample size is small, so statistical power is limited.

In the male sample, we found a significantly increased incidence of disturbed genital sensation and ejaculation in the anterior fusion group. Somewhat surprising, as in the female sample, disturbances were reported also in the posterior fusion group. It is impossible to tell from the present study if this represents a true disturbance or the uncertainty of retrospective analysis. However, we suspect that the presented differences between anterior and posterior fusion do represent the real differences. Interestingly, retrograde ejaculation was reported after both the surgical approaches. Also, it appears that retrograde ejaculation is a less frequent complication than more pleasure-related disturbances such as decreased orgasm and genital sensation.

In the present pilot study, one should not only look for strict statistical significances, but also appreciate the disclosed tendencies as potential yellow flags. From this point of view, when contemplating both female and male data, there is a trend towards more sexual disturbance in the anterior fusion group. Furthermore, data suggest that reduced sexual pleasure may be more frequent than impaired reproductive capacity.

Also, the fact that no specific type of fusion technique has been demonstrated to be superior to others [6], should make us very cautious in promoting anterior lumbar surgery. This appears particularly important now because anterior lumbar disc replacement is heavily promoted by the manufacturers of disc prostheses, without any indications as yet that it is better than a simple un-instrumented PLF.

The limitation of the present study is the retrospective nature of the gender-specific questions. As the first pilot study, we hope it will promote prospective studies of sex-

related quality of life, in which also the presently employed questionnaires need to be validated.

Conclusion

It appears that the surgically induced pain reduction related improvement in overall sexual function may be counteracted by the *surgically induced* neurological disturbance, when performing lumbar fusion for CLBP. *The anterior approach* appears to be associated with an increased risk of sexual dysfunction in men.

Acknowledgement The Swedish Spine Study Group: G. Appelgren, MD; S. Berg, MD; B. Branth, MD; C.G. Cederlund, MD; P. Elkan, MD; P. Fritzell, MD, PhD; R. Hedlund, MD, PhD; O. Hägg, MD, PhD; H. Kogler, MD; C. Leufvén, MD; G. Nemeth, MD, PhD; P. Neumann, MD, PhD; M. Nilsson, MD, PhD; K. Nordenström, MD, PhD; A. Nordweall, MD, PhD; A. Ohlin, MD, PhD; G. Oderberg, MD, PhD; T. Reigo, MD, PhD; T. Sahlstarnd, MD, PhD; R. Sandberg, MD, PhD; L. Skogland, MD, PhD; B. Strömqvist, MD, PhD; H. Tropp, MD, PhD; T. Tullberg, MD, PhD; T. Wikström, MD; J. Willén, MD, PhD.

Appendix: Questionnaires mailed to surgically treated patients immediately after the 2-year follow-up

Questionnaire for women

- Question 1. Have you, after surgery, experienced decreased ability to have orgasm?
- Question 2. Have you, after surgery, experienced increased ability to have orgasm?

- Question 3. Have you, after surgery, experienced disturbed sensation in the genital area?
- Question 4. Have you, after surgery, experienced any other disturbance in the genital area?
- Question 5. Have you, before surgery, tried but not succeeded in having children?
- Question 6. Have you, after surgery, tried but not succeeded in having children?

Questionnaire for men

- Question 1. Have you, after surgery, experienced decreased erectile function?
- Question 2. Have you, after surgery, experienced increased erectile function?
- Question 3. Have you, after surgery, experienced decreased ability to have ejaculation?
- Question 4. Have you, after surgery, experienced increased ability to have ejaculation?
- Question 5. Have you, after surgery, experienced orgasm without ejaculation?
- Question 6. Have you, after surgery, experienced disturbed sensation in the genital area?
- Question 7. Have you, before surgery, tried, but not succeeded in having children?
- Question 8. Have you, after surgery, tried, but not succeeded in having children?

Answers to all questions were YES or NO.

References

1. Blumenthal SL, Baker J, Dossett A, Selby DK (1988) The role of anterior lumbar fusion for internal disc disruption. *Spine* 13:566–569
2. Christensen FB, Bungert CE (1997) Retrograde ejaculation after retroperitoneal lower lumbar interbody fusion. *Int Orthop* 21:176–180
3. Cohn EB, Ignatoff JM, Keeler TC, Shapiro DE, Blum MD (2000) Exposure of the anterior spine: technique and experience with 66 patients. *J Urol* 164:416–418
4. Escobar E, Transfeldt E, Garvey T, Ogilvie J, Graber J, Schultz L (2003) Video-assisted versus open anterior lumbar spine fusion surgery: a comparison of four techniques and complications in 135 patients. *Spine* 28:729–732
5. Fritzell P, Hagg O, Wessberg P, Nordwall A (2001) 2001 Volvo Award Winner in Clinical Studies: lumbar fusion versus nonsurgical treatment for chronic low back pain: a multicenter randomized controlled trial from the Swedish Lumbar Spine Study Group. *Spine* 26:2521–2532 (discussion pp2532–2524)
6. Fritzell P, Hagg O, Wessberg P, Nordwall A (2002) Chronic low back pain and fusion: a comparison of three surgical techniques: a prospective multicenter randomized study from the Swedish lumbar spine study group. *Spine* 27:1131–1141
7. Kaiser MG, Haid RW Jr, Subach BR, Miller JS, Smith CD, Rodts GE Jr (2002) Comparison of the mini-open versus laparoscopic approach for anterior lumbar interbody fusion: a retrospective review. *Neurosurgery* 51:97–103 (discussion pp103–105)
8. Kleeman TJ, Ahn UM, Talbot-Kleeman A (2001) Laparoscopic anterior lumbar interbody fusion with rhBMP-2: a prospective study of clinical and radiographic outcomes. *Spine* 26:2751–2756
9. Loguidice VA, Johnson RG, Guyer RD, Stith WJ, Ohnmeiss DD, Hochschuler SH, Rashbaum RF (1988) Anterior lumbar interbody fusion. *Spine* 13:366–369
10. McAfee PC, Regan JJ, Geis WP, Fedder IL (1998) Minimally invasive anterior retroperitoneal approach to the lumbar spine. Emphasis on the lateral BAK. *Spine* 23:1476–1484
11. Newman MH, Grinstead GL (1992) Anterior lumbar interbody fusion for internal disc disruption. *Spine* 17:831–833

-
12. Rajaraman V, Vingan R, Roth P, Heary RF, Conklin L, Jacobs GB (1999) Visceral and vascular complications resulting from anterior lumbar interbody fusion. *J Neurosurg* 91:60–64
 13. Regan JJ, Aronoff RJ, Ohnmeiss DD, Sengupta DK (1999) Laparoscopic approach to L4-L5 for interbody fusion using BAK cages: experience in the first 58 cases. *Spine* 24:2171–2174
 14. Sasso RC, Kenneth Burkus J, LeHuec JC (2003) Retrograde ejaculation after anterior lumbar interbody fusion: transperitoneal versus retroperitoneal exposure. *Spine* 28:1023–1026
 15. Tiisanen H, Seitsalo S, Osterman K, Soini J (1995) Retrograde ejaculation after anterior interbody lumbar fusion. *Eur Spine J* 4:339–342
 16. Vazquez RM, Gireesan GT (2003) Balloon-assisted endoscopic retroperitoneal gasless (BERG) technique for anterior lumbar interbody fusion (ALIF). *Surg Endosc* 17:268–272