Impact of surgery for stress incontinence on morbidity: cohort study

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Abstract

Objectives: To describe the impact of surgery for stress incontinence on the severity of symptoms, other mental and physical symptoms, and overall health. To describe the incidence of postoperative complications.

Design: Prospective cohort study; questionnaires completed by patients before and 3, 6, and 12 months after surgery. Questionnaires completed by surgeons both before and after surgery.

Setting: 18 hospitals in the North Thames region.

Subjects: 442 women treated surgically for stress incontinence between January 1993 and June 1994. 367 women returned the 3 month questionnaire; 364 returned the 6 month questionnaire; and 359 returned the 12 month questionnaire. 49 surgeons provided perioperative information on 285 of the 442 women and postoperative information on 278.

Main outcome measures: Stress incontinence symptom severity index, other urinary symptoms, bowel function, mental health, complications, global measures.

Results: Most women (288; 87%) reported an improvement in the severity of their stress incontinence, though only 92 (28%) were cured (continent). These improvements persisted for at least 12 months. The likelihood of improvement was similar regardless of whether urodynamic pressure studies had been conducted before surgery. Following surgery, women were less likely to suffer from urinary frequency, nocturia, postvoid fullness, dysuria, and urgency. While mental health improved for 194 (71%), a quarter of women reported deterioration. Only 37 (10%) were satisfied with postoperative pain control. A third experienced one or more complications while in hospital, most commonly difficulty urinating. This problem affected 1 in 11 women after discharge. A year after surgery two thirds of women reported feeling better (251; 72%), that the outcome met or exceeded their expectations (230; 66%), and that they would recommend the operation to a friend in a similar situation (239; 68%). Surgeons tended to be more optimistic about the effects of surgery; they were satisfied with the outcome in 176 (85%) cases and would again treat 245 (94%) of the women as they had done previously.

Conclusions: Although surgery reduces the severity of stress incontinence it is not as effective as current textbooks suggest. Women considering surgery should be provided with more accurate information on the likelihood of an improvement in symptoms and the occurrence of complications, including postoperative pain. Urgency and urge incontinence should not be considered contraindications to surgery. The need for urodynamic assessment before surgery should be reappraised.

Introduction

Surgery is recommended for women with urinary stress incontinence that has not responded to non-surgical measures and is causing social distress.¹ The surgical procedures used in the United Kingdom are colposuspension, needle suspension, and anterior colporrhaphy. About 85% of women are continent one year after colposuspension and 50% to 70% after needle suspension or anterior colporrhaphy.² Most textbooks reflect the literature and suggest that surgery is highly effective in curing stress incontinence in women.³⁻⁶

Appraisal of the 31 randomised and non-randomised prospective comparative studies reported in the literature, however, shows their methodological quality to be poor: cases are inadequately defined, outcome measures rarely consider either the patients' views or independent assessments and instead are based on surgeons' opinions, and the measures are of unknown reliability and validity. The external validity (generalisability) of the results is uncertain since most studies have been conducted in specialist centres and it is impossible to know whether the findings can be generalised to other settings.

To overcome these deficiencies we followed a large cohort of women undergoing surgery for stress incontinence in the United Kingdom from the time of or the day before surgery until 12 months after. Women were recruited from the lists of 49 surgeons working in 18 hospitals to provide a representative sample. Women were eligible for inclusion in the study if they were having surgery for stress incontinence, regardless of whether it had been confirmed by urodynamic studies. Because many believe that surgery is effective only in women with genuine stress incontinence—that is incontinence confirmed by urodynamic pressure studies—data are presented both for the whole cohort and for those with genuine stress incontinence. The evaluation of outcome was based on patients' views using validated measures.

We describe the impact of surgery on the severity of stress incontinence, other mental and physical symptoms (including urge incontinence), coexisting conditions, and global measures of health. We also describe the incidence of postoperative complications.

Subjects and methods

In 1992 all of the 137 gynaecologists and urologists who performed surgery for stress incontinence in the 33 NHS hospitals in the former North West and North East Thames regions (now known as the North Thames region) were invited to participate in the study. Sixty four agreed, 13 declined, and 60 did not reply. Of those who agreed to participate, 38 gynaecologists and 11 urologists working in 18 hospitals were selected as representative in terms of caseload, specialty, whether the surgery was done in a teaching or district general hospital, and whether the hospital served a rural, suburban, or urban population.

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All women having surgery for stress incontinence between January 1993 and June 1994 were eligible for inclusion. Women were excluded if they were unable to read and understand English. Women were recruited by nursing staff during their stay in hospital. After giving consent, women completed a perioperative questionnaire, whose development has been described.⁷ Women provided information on socio-demographic factors, the history of urinary incontinence, extent and severity of stress incontinence (based on a newly developed symptom severity index),⁸ other urinary symptoms, coexisting conditions (based on an index similar to that used in other studies^{9 10} and described elsewhere⁸), mental health (based on an existing validated index),¹¹ and their expectations of surgery. Surgeons provided information on the women's preoperative state, including results of tests and surgical management. Surgeons who did not respond received three written reminders.

All eligible women were identified from registers in each hospital. Information on non-participants was obtained from the hospital episode system. Participating and non-participating women were compared in terms of age, surgical procedure, hospital where they were treated, and length of stay.

Patients completed three postal questionnaires (at 3, 6, and 12 months after surgery). These covered the same topics as the perioperative questionnaire. Additionally, some questions were included to obtain women's perceptions of the impact of surgery, details of any postoperative complications, and length of recovery time. Non-respondents were compared with respondents to determine any response bias.

To minimise work for the surgeons and cost to the NHS, surgeons were asked to see only one third, rather than all, of the patients as outpatients at the three non-routine follow up examinations of this study at 3, 6, and 12 months after surgery. Surgeons completed a short questionnaire on the severity of any persistent stress incontinence, postoperative complications, and the outcome of surgery.

The study was descriptive. The objective was to provide preliminary estimates of variables and to generate hypotheses for testing in more specific studies using randomised trials when practical. Calculations of sample size based on specific hypotheses were therefore inappropriate.

Several statistical tests were used to detect changes in health. Student's *t* tests were used to find differences in mean values of continuous variables and χ^2 tests for differences in proportions of categorical variables. When measurements taken before and after surgery on the same patient were analysed, paired *t* tests and McNemar's tests for proportions were used. Repeated measures analysis of variance was used to assess change between 3 and 12 months after surgery using the generalised linear modelling procedure (SAS version 6.06).¹² Non-normally distributed data were tested using the Wilcoxon matched pairs signed rank test.

Results

Recruitment and response

During the study period 650 women had surgery for stress incontinence, of whom 631 (97%) were invited to participate. Questionnaires were returned by 521

Table 1 Comparison of women who responded and did not respond to questionnaire 12 months after surgery for stress incontinence. Values are numbers (percentages) unless otherwise indicated

	Respondents (n=359)	Non-respondents (n=83)
Mean age (SD)	52.1 (11.0)	51.5 (12.5)
Social class:		
Information missing	97 (27)	24 (29)
I and II (professional and managerial workers)	62 (24)	15 (25)
IIINM (skilled non-manual workers)	107 (41)	19 (32)
IIIM (skilled manual workers)	23 (9)	9 (15)
IV and V (semiskilled and unskilled manual workers)	70 (27)	16 (27)
Severity of symptoms before surgery:		
Information missing	19 (5)	7 (8)
1-4 (mild)	19 (6)	0
5-8	48 (14)	8 (11)
9-12 (moderate)	85 (25)	19 (25)
13-16	110 (32)	24 (32)
17-20 (severe)	78 (23)	25 (33)
Type of surgery:		
Information missing	14 (4)	3 (4)
Colposuspension	180 (52)	43 (54)
Needle suspension	41 (12)	12 (15)
Anterior colporrhaphy	110 (32)	19 (24)
Other	14 (4)	6 (8)

(83%) women. However, 62 of the 521 (12%) questionnaires were received late (and we could not guarantee that they had been completed before the women were aware of the short term outcome of their surgery) and 17 of the 521 (3%) were not completed. Thus, 442 out of 650 (68%) women were successfully recruited. Non-participants were similar to participants in age (mean age 52 years in both cases), length of hospital stay (mean 8.3 *v* 8.1 days), and type of surgical procedure (colposuspension 116/197 (59%) *v* 223/425 (53%); anterior colporrhaphy 46/197 (23%) *v* 129/425 (30%); needle suspension 28/197 (14%) *v* 53/425 (13%); other 7/197 (4%) *v* 20/425 (5%)). Surgeons completed perioperative questionnaires for 285 of the 442 (64%) women recruited into the study. There was no significant response bias: there was no difference in the mean age of patients (52 years) or in the frequency distributions of scores on the symptom severity index (*P* = 0.09).

A total of 367 of the 442 participants (83%) returned the three month postoperative questionnaire, 364 (82%) the six month questionnaire, and 359 (81%) the 12 month questionnaire. Although differences between respondents and non-respondents after 12 months were slight (table 1), non-respondents were more likely to have had more severe symptoms (25/76 (33%) non-respondents had severe symptoms *v* 78/340 (23%) respondents).

Surgeons provided postoperative data on 278 of the 442 women (63%). These women were similar to the 164 for whom such data were not available (difference in mean age 0.5 years (95% confidence interval -2.4 to 1.9); distribution of preoperative symptom severity χ^2 0.8, *df* = 4, *P* = 0.9). Respondents were more likely to have had a colposuspension (149/262 (57%) *v* 83/180 (46%)) and less likely to have had a needle suspension (18/262 (7%) *v* 47/180 (26%)) (*P* < 0.001).

Severity of stress incontinence

Before surgery 341 out of 416 women (82%) reported moderate or severe symptoms (symptom severity index ≥ 9) (table 2). Three months after surgery 288 out of 348 women reported an improvement (83%), 17 experienced no change (5%), and 27 (8%) reported that their condition worsened (fig 1). Altogether 92 out of 333 (28%) women achieved continence and an additional 59 out of 333 (18%) suffered from incontinence only once a month or less. The amount leaked had also reduced: before surgery 135 out of 442 (31%) described their usual loss as a cupful or more, but after surgery only 31 out of 360 (9%) still experienced such losses. This was reflected in a change in pad use: 105 out of 357 (29%) were using pads after surgery, compared with 333 out of 431 (77%) before.

Improvements reported three months after surgery persisted throughout the first year after surgery (table 2). Repeated measures analysis of variance of the distribution of symptom severity scores over the 3 to

Fig 1 Comparison of distribution of symptom severity scores before and 3 months after surgery. A score of 0 indicates that patient is considered cured

Fig 2 Mean scores on the symptom severity index before and 3, 6, and 12 months after surgery

Table 2 Scores on the symptom severity index before and 3, 6, and 12 months after surgery. Values are numbers of women (percentages) unless otherwise indicated

Score on symptom severity index	Before surgery (n=442)	3 months after surgery (n=367)	6 months after surgery (n=364)	12 months after surgery (n=359)
Information missing	26	19	7	24
1-4 (mild)	19 (5)	184 (53)	192 (54)	179 (53)
5-8	56 (14)	75 (22)	69 (19)	56 (17)
9-12 (moderate)	104 (25)	37 (11)	41 (12)	44 (13)
13-16	134 (32)	41 (12)	38 (11)	40 (12)
17-20 (severe)	103 (25)	11 (3)	17 (5)	16 (5)
Mean	12.8	5.5	5.6	5.8
Median	14	4	4	4
SD	4.2	5.1	5.3	5.5

12 month period gave a significant result ($P=0.003$). The data suggest that there was a slight deterioration at 12 months (difference between mean preoperative and mean score after three months of follow up was 7.0 compared with 6.6 at 12 months).

The amount of improvement depended on severity of stress incontinence before surgery (fig 2). Women with severe symptoms (scores ≥ 13) obtained a greater reduction in severity scores than women with moderate or mild symptoms (scores ≤ 12). The more severe a woman's symptoms were before surgery the more severe her symptoms after surgery. Thus, women with preoperative scores of 1-8 had scores of about 3 after surgery, whereas women with preoperative scores of 13-20 had mean scores of about 7 after surgery.

Data on the extent of changes in the severity of symptoms were available from women and surgeons for 193 of the 278 (69%) women whose surgeons provided information. For 108 (56%) the two assessments were similar, for 28 (15%) the surgeons underestimated the benefits of surgery, and for 57 (30%) the benefits were overestimated.

Many believe that women with genuine stress incontinence respond better to surgery than women who have not had urodynamic pressure studies performed. Of the 285 women for whom information was available from their surgeons, 164 had undergone pressure studies and 103 had not (there were no data for 18 women). Comparison of these groups showed a similar difference in mean preoperative symptom severity score: 12.2 for women with genuine stress incontinence *v* 14.6 for women whose stress incontinence was not diagnosed uroynamically (difference 2.4 (1.4 to 3.4)). One year after surgery the difference was even less: 5.7 *v* 6.0 (difference 0.3 (-1.2 to 1.8)). The proportions of women cured (continent) were also similar: 24% *v* 26% ($P=0.8$).

Impact on other symptoms and comorbid conditions

While surgery had no impact on the prevalence of some urinary symptoms (cystitis, straining to start, hesitancy), it led to an improvement in others which lasted for at least 12 months. There were improvements in frequency (micturition every hour or less 42% to 18%; difference 24% (19% to 29%), $P<0.001$); nocturia (micturition twice or more a night 52% to 27%; difference 25% (21% to 30%), $P<0.001$); urgency (not able to wait more than 2 minutes 41% to 24%; difference 17% (13% to 21%), $P<0.001$); postvoid fullness (ever 73% to 54%; difference 18% (14% to 22%),

Table 3 Change in severity of urinary symptoms (apart from stress incontinence) in women having surgery for stress incontinence. Values are numbers of women (percentages) unless otherwise indicated

	Before surgery (n=442)	3 months after surgery (n=367)	6 months after surgery (n=364)	12 months after surgery (n=359)
How often do you urinate/pass water during the day?				
Information missing	5	3	0	11
≤30 min	53 (12)	15 (4)	10 (3)	9 (3)
Every hour	132 (30)	54 (15)	54 (15)	55 (16)
Every 2 hours	146 (33)	127 (35)	120 (33)	112 (32)
Every 3 hours	68 (16)	127 (35)	121 (33)	117 (34)
≥4 hours	38 (9)	41 (11)	59 (16)	55 (16)
How many times do you have to get up during the night to urinate/pass water?				
Information missing	4	3	1	11
≥4	44 (10)	10 (3)	5 (1)	9 (3)
3 times	70 (16)	30 (8)	31 (9)	32 (9)
2 times	115 (26)	62 (17)	64 (18)	54 (16)
1 time	147 (34)	164 (45)	158 (44)	157 (45)
Never	62 (14)	98 (27)	105 (29)	96 (28)
Once you feel that you want to urinate/pass water how long can you hold on?				
Information missing	6	3	2	10
Not at all	83 (19)	34 (9)	27 (8)	29 (8)
≤2 min	95 (22)	58 (16)	51 (14)	54 (16)
2-5 min	130 (30)	90 (25)	90 (25)	91 (26)
6-10 min	51 (12)	71 (20)	78 (22)	66 (19)
>10 min	77 (18)	111 (31)	116 (32)	109 (31)
How often do you have the feeling that your bladder is still full after you have urinated/passed water?				
Information missing	31	0	3	4
Always	0	4 (1)	5 (1)	8 (2)
Mostly	79 (18)	21 (6)	16 (4)	20 (6)
Half the time	72 (17)	19 (5)	26 (7)	15 (4)
A few times	141 (35)	134 (37)	150 (42)	150 (42)
Never	119 (27)	189 (52)	164 (45)	162 (46)
How often do you get any pain or burning when you urinate/pass water?				
Information missing	7	5	6	3
Always	7 (2)	4 (1)	0	0
Mostly	27 (6)	12 (3)	6 (2)	13 (4)
Half the time	25 (6)	11 (3)	13 (4)	7 (2)
A few times	173 (40)	108 (30)	84 (23)	99 (28)
Never	203 (47)	227 (63)	255 (71)	237 (67)

Table 4 Changes in comorbidity, general health status, and mental health in women having surgery for stress incontinence. Values are numbers of women (percentages) unless otherwise indicated

Index	Before surgery (n=442)	3 months after surgery (n=367)	6 months after surgery (n=364)	12 months after surgery (n=359)
Comorbidity⁸:				
Information missing	17	12	10	11
None	232 (55)	195 (55)	190 (54)	192 (55)
Mild	95 (22)	101 (29)	94 (27)	85 (24)
Moderate	72 (17)	40 (11)	48 (14)	53 (15)
Severe	26 (6)	19 (5)	22 (6)	18 (5)
General health⁷:				
Information missing	8	3	2	4
Excellent	64 (15)	45 (12)	47 (13)	41 (12)
Very good	136 (31)	115 (32)	113 (31)	118 (33)
Good	165 (38)	116 (32)	122 (34)	121 (34)
Fair	62 (14)	75 (21)	69 (19)	61 (17)
Poor	7 (2)	13 (4)	11 (3)	14 (4)
Mental health¹¹:				
Information missing	18	24	20	47
1-4 (excellent)	159 (38)	209 (61)	209 (61)	195 (63)
5-8 (good)	193 (46)	96 (28)	89 (26)	80 (26)
9-12 (fair)	50 (12)	25 (7)	31 (9)	30 (10)
13-18 (poor)	22 (5)	13 (4)	15 (4)	7 (2)

$P < 0.001$); and dysuria (ever 53% to 33%; difference 20% (16% to 24%), $P < 0.001$) (table 3).

Surgery had some effect on bowel function. A year after surgery, fewer women described their function as “about right” (167/350 (48%) after surgery *v* 269/433 (62%) before surgery; difference 14% (9% to 20%), $P < 0.001$) and more described it as “variable.” There was little change in the proportions who saw themselves as “constipated” (56/350 (16%) *v* 79/433 (18%)), or as having “diarrhoea” (14/350 (4%) *v* 13/433 (3%)).

When the severity distribution of comorbidity was compared before surgery and one year later it was largely unchanged (table 4). Similarly, there was no significant change in the distribution of women’s perceptions of their general health (table 4).

Mental health

Before surgery, 265 out of 424 women (63%) reported some mental health problems (index scores of ≥ 5) (table 4). This fell to about 134 out of 343 (39%) three months later (McNemar’s test, $P < 0.0001$) and was sustained over the following nine months. Overall, 194 out of 309 (63%) reported an improvement in mental health, 36/309 (12%) reported no change, and 79/309 (26%) reported worsening mental health.

Postoperative complications

Altogether 67 out of 366 women (18%) reported “a great deal” of pain during the first 24 hours after surgery despite receiving postoperative analgesia. A further 130 (36%) reported “a fair amount.” Only 37 (10%) reported fully successful pain control. Overall, 119 out of 360 women (33%) reported one or more complications during their hospital stay, the commonest being urinary retention (76/360 (21%)) and vaginal bleeding (47/360 (13%)) (table 5).

After discharge, women continued to report complications. During the first three months after surgery 31 (9%) reported difficulty urinating, 25 of whom required catheterisation. This was a rare event after three months. Although other complications were reported, these rarely resulted in a visit to a general practitioner or hospital specialist.

Overall impact

About 70-75% of patients felt better three months after surgery (table 6). This perceived benefit persisted throughout the first year after surgery. About 17% of the others reported no benefit from the operation and, for the first six months about 7% felt their health had deteriorated. The proportion who felt worse rose during the second six months so that one year after surgery 41 (11%) reported feeling worse than before surgery.

About 65% to 70% of patients rated the outcome as, or better than, expected. This view remained largely unchanged during the first year after surgery. A similar proportion felt their recovery had been as, or faster than, expected. In contrast to the expected outcome, patients tended to be less critical of the speed of their recovery as time progressed (one year later 95 (27%) felt it was slower than expected compared with 133 (37%) after three months). These assessments were consistent with the finding that a year after surgery only 239 (68%) would recommend surgery to a friend (table 6).

Surgeons tended to view the outcome of surgery more optimistically. They felt the outcome was as expected or better than expected for 176 out of 207 women (85%) and worse in only 31 (15%) cases. Surgeons would have changed their clinical management in only 13 (6%) women.

Discussion

Outcomes of surgery

While most women benefited from surgical treatment for stress incontinence, surgery was not as successful as claimed in most textbooks and reported by other studies. Although 87% reported some improvement in their condition, only 28% achieved continence (compared to previous claims of up to 85%).² This difference probably occurred because we used women's reports of their symptoms, unlike previous studies which have used the operating surgeon's views.

The benefits of surgery were not confined to improvements in stress incontinence. The prevalence and severity of several other urinary symptoms also decreased. Unexpectedly, these included urgency, a symptom believed to worsen after surgery and often considered to be a contraindication.³⁻⁶ The prevalence of women with severe urgency fell from 41% before surgery to 24% after.

The mental health of many (63%) women improved with the reduction in the severity of their stress incontinence. The finding that 25% of women reported worse mental health after surgery is of concern. It may reflect disappointment in the outcome of a treatment that many women regard as their last hope.

Postoperative complications were more common than previous studies have suggested. This may be because our data came from patients rather than surgeons and because previous studies have been done in specialist centres and involved surgeons with a particular interest in the subject. Given that 1 in 6 women reported difficulty urinating for up to three months after surgery, patients should be warned of this potential problem. The high prevalence of inadequately controlled pain after surgery indicates the need for better pain management. Better preoperative information may reduce the need for postoperative analgesia.¹³

Responses to the global questions on women's views of their treatment were remarkably consistent. About 70% were satisfied with the outcome. While this is reassuring for potential patients and for surgeons, it is not as optimistic as the views of the surgeons in this study (or reported in previous studies).²

Methodological limitations

Rates of both recruitment (68%) and patient response (81% at 12 months) were high. If any bias was introduced it was that the women studied were less likely to be severely incontinent (55% of participants severely incontinent *v* 70% of non-participants). This bias would reinforce the finding that poor outcomes are more common than previously believed. There was also concern over the relatively low response rates of surgeons to the perioperative (64%) and postoperative (63%) questionnaires. There was a greater likelihood of surgeons reporting on women who had undergone a colposuspension rather than needle suspension. The effect this may have had on the outcomes reported by

Table 5 Incidence of complications reported by women after surgery for stress incontinence. Values are numbers (percentages) unless otherwise indicated

	In hospital (n=367)	In hospital to 3 months after surgery (n=367)	3 to 6 months after surgery (n=364)	6 to 12 months after surgery (n=359)
Retention:				
Reported difficulty urinating	0	31 (9)	20 (6)	23 (6)
Reported catheter insertion	76 (21)	25 (7)	2 (1)	3 (1)
Wound infection:				
Reported on questionnaire	0	58 (16)	14 (4)	4 (1)
Saw GP	0	12 (3)	7 (2)	1 (0.3)
Saw specialist	30 (8)	2 (1)	3 (1)	2 (1)
Vaginal bleeding:				
Reported on questionnaire	0	44 (12)	7 (2)	7 (2)
Saw GP	0	3 (1)	2 (1)	3 (1)
Saw specialist	47 (13)	2 (1)	2 (1)	0
Urinary infection:				
Saw GP	0	34 (9)	47 (13)	31 (9)
Saw specialist	22 (6)	2 (1)	2 (1)	5 (1)
Pain:				
Reported on questionnaire	197 (54)*	65 (18)	47 (13)	32 (9)
Saw GP	0	23 (6)	13 (4)	10 (3)
Saw specialist	0	5 (1)	2 (1)	2 (1)

*"A fair amount" or "a great deal" during the first 24 hours after surgery.

surgeons is unclear. One further limitation was the relatively short outcome period. There is considerable evidence that the benefits of surgery deteriorate over time so it would be desirable to reassess the study participants again after a few years.

Implications for clinical practice

The findings of this study have six implications for clinical practice. Firstly, they show that it is possible to collect standardised data from patients on the severity of their stress incontinence rather than relying on surgeons' impressions. Secondly, there is a need to reassess the information given to women considering surgery. Thirdly, there is clearly a need for better post-operative pain control; many women are suffering unnecessarily. Fourthly, we found no evidence that

Table 6 Impact of surgery for stress incontinence as judged by global questions. Values are numbers (percentages) unless otherwise indicated

	3 months after surgery (n=367)	6 months after surgery (n=364)	12 months after surgery (n=359)
Results of surgery:			
Information missing	3	3	8
Better than expected	116 (32)	119 (33)	104 (30)
As expected	136 (37)	128 (36)	126 (36)
Not as good as expected	112 (31)	114 (32)	121 (35)
Recommend operation to a friend:			
Information missing	3	2	7
Yes	248 (68)	245 (68)	239 (68)
Unsure	91 (25)	84 (23)	81 (23)
No	25 (7)	33 (9)	32 (9)
Change in health:			
Information missing	3	4	9
Much better	209 (57)	205 (57)	199 (57)
A little better	67 (18)	67 (16)	52 (15)
About the same	63 (17)	63 (17)	58 (17)
A little worse	15 (4)	15 (4)	19 (5)
Much worse	10 (3)	10 (3)	22 (6)
Speed of recovery:			
Information missing	5	4	8
Faster than expected	75 (21)	80 (22)	74 (21)
As expected	154 (43)	175 (49)	182 (52)
Slower than expected	133 (37)	105 (29)	95 (27)

Key messages

- Although surgery improves stress incontinence in most women (87%), only 28% are continent one year later
- The need for preoperative urodynamic testing should be reappraised
- Urgency and urge incontinence should not be considered contraindications to surgery
- Women considering surgery should receive more accurate information on the probability of an improvement in symptoms and possible complications
- There is a need for a rigorous, pragmatic, randomised trial of surgery for stress incontinence

urgency and urge incontinence are contraindications to surgery; indeed, surgery was associated with a reduction in the prevalence of this problem. Fifthly, the role of urodynamic testing needs reappraisal. As patients were not randomised it is not possible to conclude with certainty that urodynamic testing has little or no prognostic value. The only alternative explanation for our findings is that the 39% of women who had surgery without urodynamic confirmation of genuine stress incontinence were carefully (and accurately) selected by surgeons on the basis of their medical history and clinical examination. And finally, the consistent reports of outcome between 3 and 12 months after surgery suggest that care of these patients can be audited at any time during this period. This allows follow up of patients in batches rather than necessitating the organisation of a continuous system in which all women are followed up at the same point in time after their operation.

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Change in social status and risk of low birth weight in Denmark: population based cohort study

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Abstract

Objective: To estimate the risk of having a low birthweight infant associated with changes in social, environmental, and genetic factors.

Design: Population based, historical cohort study using the Danish medical birth registry and Statistic Denmark's fertility database.

Subjects: All women who had a low birthweight infant (<2500 g) (index birth) and a subsequent liveborn infant (outcome birth) in Denmark between 1980 and 1992 (exposed cohort, n = 11 069) and a random sample of the population who gave birth to an infant weighing ≥2500 g and to a subsequent liveborn infant (unexposed cohort, n = 10 211).
Main outcome measures: Risk of having a low birthweight infant in the outcome birth as a function of changes in male partner, area of residence, type of job, and social status between the two births.

Results: Women in the exposed cohort showed a high risk (18.5%) of having a subsequent low birthweight infant while women in the unexposed cohort had a

risk of 2.8%. After adjustment for initial social status, a decline in social status increased the absolute risk of having a low birthweight infant by about 5% in both cohorts, though this was significant only in the unexposed cohort. Change of male partner did not modify the risk of low birth weight in either cohort.
Conclusion: Having had a low birthweight infant and a decline in social status are strong risk factors for having a low birthweight infant subsequently.

Introduction

Low birth weight (birth weight <2500 g) is one of the main risk factors for infant mortality. Low birth weight occurs frequently in industrialised countries—for example in 5.3% of all births in Denmark.¹ Fetal growth is determined by genetic as well as other factors²⁻⁶ and low birth weight and impaired fetal growth run in families.^{4 7-11} Maternal height and weight, socioeconomic group, smoking,^{2 5 12 13} and the intrauterine environment^{3 5 14 15} are important determinants of birth weight. Height of the father is correlated with the birth weight of