PAPERS AND SHORT REPORTS

Psychological sequelae to elective sterilisation: a prospective study

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Abstract

A total of 201 women were interviewed four weeks before elective interval tubal sterilisation, of whom 190 (94.5%) were assessed again six months postoperatively and 193 (96.0%) 18 months postoperatively. Before sterilisation the prevalence of psychiatric morbidity as measured by the present state examination was 10.4% (21 patients), no greater than might be expected in a general population sample; six months after the operation the prevalence was significantly reduced to 4.7% (nine patients); and 18 months postoperatively it had returned almost to the preoperative value (9.3%; 18 patients). Postoperative psychosexual disturbance was rare, only 3% of patients reporting reduced enjoyment of sexual intercourse at either follow-up. Considerable regret was reported by only five patients (2.6%) six months after the operation and by eight (4.1%) 18 months after the operation; however, some dissatisfaction was reported by 15 patients (7.9%) at six months and 21 patients (10.9%) at 18 months. Postoperative psychiatric disturbance and dissatisfaction were largely associated with preoperative psychiatric disturbance.

Thus there was no evidence that elective interval sterilisation increased the risk of psychiatric disturbance up to 18 months after the operation.

Introduction

In recent years the number of women undergoing elective interval sterilisation in the United Kingdom has risen sharply.^{1 2}

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The procedure is called elective because carried out as a preferred method of contraception and not for medical reasons; it is an interval procedure because not done at the same time as termination of pregnancy or early in the puerperium. It is performed mainly by laparoscopic techniques. In Oxford the number of women undergoing the procedure rose from 92 in 1971 to 818 in 1978 (Oxford record linkage study). Similar rises have been reported in England and Wales as a whole.¹

Before interval sterilisation became so common there had been several studies of possible psychiatric complications of sterilisation procedures that were done predominantly for medical reasons and often in association with termination of pregnancy or with childbirth. Three main adverse reactions were identified—namely, psychiatric disorders, psychosexual problems, and regret at having been sterilised—the highest rates reported for each of these being 60%,³ 65%,⁴ and 43%,⁵ respectively. Most of the early studies, however, were based on samples that were heterogeneous in gynaecological indications and procedures; nearly all were retrospective and based on low follow-up rates; and hardly any used standardised methods of assessment. It is therefore difficult to draw firm conclusions from such reports.

There have been no psychiatric studies specifically concerned with women undergoing elective interval sterilisation. Since this procedure is becoming widely practised in Britain, and since its psychiatric sequelae are largely unknown, we carried out a prospective study using standardised psychiatric measures.

Patients and methods

The patients studied were a consecutive series of women receiving elective interval sterilisation in Oxford over the period June 1978 to February 1979. They all lived within 15 miles of Oxford but were otherwise unselected. The study was prospective in that the patients were interviewed four weeks before sterilisation and again six months and 18 months after the operation. The interview lasted about an hour. It included a standardised psychiatric examination of mental state, the present state examination,⁶ which covered the four weeks preceding interview; and semi-structured schedules covering psychosexual functioning and psychiatric history. The patients also completed two well-established self-administered questionnaires, the profile of mood states⁷ and the Eysenck personality inventory.⁸ A modified version of

the social adjustment scale was also included⁹ (the original American version of this has been modified in Oxford for use in the UK; this new version has been validated against interview).

Interviews were conducted by a psychologist (PC) and two psychiatrists (RF and NR). Agreement between the interviewers was checked throughout the study and found to be consistently high.

Paired and unpaired statistical tests were used as appropriate.

Results

A total of 242 patients were invited to join the study, of whom 33 (13.6%) declined and eight (3.3%) were excluded at their general practitioners' request. The remaining 201 (83.1%) were interviewed before sterilisation; of these, 190 (94.5%) were interviewed six months and 193 (96.0%) 18 months postoperatively. Information from general practitioners and from gynaecological case notes showed no important differences between patients who participated in the study and those who did not (see below). Of the 201 patients interviewed, 193 (96%) were sterilised by laparoscopy and eight (4%) by tubal ligation.

The mean age of the patients was 35.4 years (SD 4.5); 63 patients (31.3%) were 30-34 years of age, 81 (40.3%) 35-40 years, and only 19 (9.5%) under 30 years. Compared with the background population of Oxfordshire, social classes I and II were overrepresented among the patients while social classes IV and V were underrepresented ($\chi^2 = 39.3$, $df = 4$, $p < 0.001$).

CHANGES AFTER STERILISATION

Psychiatric measures

Present state examination—Levels of psychiatric morbidity were determined mainly with the present state examination index of definition. This is a method of determining the confidence with which a psychiatric disorder may be regarded as being present. It consists of a set of rules that operate not only on the size of the total score but also on the type, severity, and combination of symptoms to define eight levels of psychiatric disorder. According to Wing,¹¹ at index of definition level 5 "sufficient components of the key syndromes are present to allow classification into one of the functional psychoses or neuroses." For research purposes this level can be used as a threshold for identifying significant psychiatric disorder. In this paper we will follow the accepted usage of referring to patients at index of definition level 5 and above as "cases," and those below level 5 as "non-cases" whether or not some psychiatric symptoms were present. Preoperatively 21 patients (10.4%) were identified as psychiatric cases; six months postoperatively there were nine (4.7%) such patients, a significant reduction (McNemar $\chi^2 = 6.67$, $p < 0.001$), while 18 months after surgery there were 18 such patients (9.3%). We compared our patients with a random general population sample of 237 women from a defined district of London, of whom 29 (12.2%) were found to be psychiatric cases at index of definition level 5 and above using the present state examination.¹⁰ Our patients and the London general population sample differed in social-class distribution, the London sample having a significantly greater proportion in social classes IV and V ($\chi^2 = 10.06$, $df = 2$, $p < 0.01$). Nevertheless, the comparison strongly suggested that the proportion of psychiatric cases in our Oxford sample was not excessive. Before sterilisation, the proportion of psychiatric cases (10.4%) did not differ significantly from that among the general population ($\chi^2 = 0.19$, $df = 1$); six months postoperatively the proportion (4.7%) was significantly lower than that among the general population ($\chi^2 = 6.42$, $df = 1$, $p < 0.01$), while 18 months postoperatively the proportion (9.3%) again did not differ significantly ($\chi^2 = 0.65$, $df = 1$). Among the 180 patients who were non-cases before surgery according to the present state examination and thus were at risk of developing a psychiatric disorder after the operation, only two (1.1%) had done so six months postoperatively and 12 (6.7%) 18 months postoperatively. By contrast, among the 21 women who had been cases before the operation 13 (61.9%) became non-cases six months postoperatively and 15 (71.4%) had none 18 months postoperatively.

Profile of mood states—This scale was analysed in terms of the total score and of five subfactors—namely, anger, fatigue, tension, depression, and vigour. Six months after surgery the mean total score in all the patients had improved significantly compared with the preoperative value ($t = 3.68$, $df = 189$, $p < 0.001$) as had the subfactors

anger ($t = 2.35$, $df = 189$, $p < 0.05$), tension ($t = 5.82$, $df = 189$, $p < 0.001$), and depression ($t = 2.55$, $df = 189$, $p < 0.01$). Eighteen months after surgery improvements were less pronounced, remaining significant only for anger ($t = 2.25$, $df = 192$, $p < 0.05$) and tension ($t = 3.42$, $df = 192$, $p < 0.001$). None of the variables changed for the worse postoperatively.

Psychosexual functioning

At all three interviews patients were asked to report their frequency of sexual intercourse in the preceding four weeks. Compared with before sterilisation, six months postoperatively the reported frequency had increased in 61 patients (32%), remained unchanged in 93 (49%), and decreased in 36 (19%); at this follow-up the mean frequency in the whole group was significantly increased ($t = 3.23$, $df = 185$, $p < 0.001$). Eighteen months after the operation the reported frequency had increased in 54 (28%), remained unchanged in 89 (46%), and decreased in 50 (26%); the mean frequency was no different from that preoperatively ($t = 1.12$, $df = 187$).

When asked to compare their enjoyment of sexual intercourse before and after sterilisation, 97 (52%) rated it as more enjoyable and five (2.7%) as less enjoyable six months postoperatively; while after 18 months 105 (55%) rated it as more enjoyable and six (3.2%) as less enjoyable.

Social adjustment

The social adjustment scale was analysed in terms of mean total score and of subscores for seven defined areas of social functioning. Compared with before sterilisation, six months after the operation the mean total score in the whole group had improved significantly ($t = 3.82$, $df = 189$, $p < 0.001$), as had the two subscores social and leisure activities ($t = 3.45$, $df = 189$, $p < 0.001$) and functioning in the family ($t = 2.69$, $df = 189$, $p < 0.01$). Eighteen months after the operation the only subscore that remained significantly improved was functioning in the family ($t = 2.57$, $df = 192$, $p < 0.01$), but none of the mean scores was worse than preoperatively.

Regret

Of the 190 patients interviewed six months after sterilisation, 15 (7.9%) expressed dissatisfaction of some kind. In response to direct questioning five of these said they wished that they had not had the operation. Eighteen months after the operation 21 (10.9%) patients expressed some dissatisfaction, of whom eight wished that they had not had the operation. In order of frequency dissatisfaction was related to desire for another child; menstrual problems; loss of the sense of fertility; sexual problems; general ill health; marital breakdown; and moral doubts. Six months after the operation four patients reported that they had considered seeking reversal of the operation but only one of them intended to do so. Eighteen months postoperatively six patients had considered reversal but only two of them seriously.

CORRESPONDENCE BETWEEN MEASURES

At each of the three stages of the inquiry there was a high correspondence between the different measures of psychiatric and social functioning. Thus before sterilisation the degree of psychiatric morbidity as measured by the present state examination was highly correlated with impairment of mood, psychosexual functioning, and social functioning. The same associations were found at the six-month and 18-month follow-ups, when there was also a strong association between the degree of psychiatric morbidity and feelings of regret.

RELATION BETWEEN PREOPERATIVE MEASURES AND PSYCHIATRIC OUTCOME

It is of particular interest to examine any associations between the patients' preoperative characteristics and their psychiatric wellbeing after the operation.

Preoperative psychiatric measures

Although after sterilisation only small proportions of the patients were psychiatric cases according to the present state examination or expressed regrets at having been sterilised, nevertheless some distinctive associations were found.

Psychiatric outcome—Table I shows that at the six-month follow-up psychiatric cases according to the present state examination had significantly higher scores than those without such symptoms, for most of the preoperative measures, including present state examination total score; profile of mood states total score and four of the five subscores; social adjustment total score and five of the seven

patients who expressed dissatisfaction had a history of psychiatric referral ($\chi^2=5.34$, $df=1$, $p<0.05$; and $\chi^2=13.03$, $df=1$, $p<0.001$, respectively).

Demographic factors

Psychiatric outcome—Age was not significantly associated with psychiatric state as assessed by the present state examination either preoperatively or six months postoperatively. At the 18-month follow-up, however, a significantly greater proportion of patients aged

TABLE I—Relation between preoperative measures (assessed four weeks before sterilisation) and postoperative psychiatric state. (Figures are mean scores)

	Six months after sterilisation			18 months after sterilisation		
	Cases (n=9)	Non-cases (n=181)	t	Cases (n=18)	Non-cases (n=175)	t
Present state examination:						
Total	18.27	2.62	9.21***	7.11	3.07	2.71**
Profile of mood states:						
Anger	6.22	3.54	2.39*	4.27	3.59	0.70
Tension	16.11	6.41	7.09***	10.78	6.45	4.00***
Depression	12.44	2.71	6.51***	5.06	3.02	1.72†
Fatigue	9.56	5.57	3.10**	8.39	5.43	3.20**
Vigour	12.78	11.01	1.32	12.17	10.96	1.22
Total	57.11	29.14	5.87***	41.06	29.29	3.20**
Social adjustment scale:						
Work	1.71	1.41	2.66**	1.51	1.41	1.18
Housework	2.20	1.64	3.12**	1.69	1.66	0.19
Social and leisure	2.36	1.86	3.18**	2.17	1.86	2.73**
Extended family	2.03	1.80	1.76†	1.88	1.80	0.80
Marital	2.44	1.87	3.10**	2.06	1.88	1.39
Parental	1.97	1.70	1.76†	1.83	1.69	1.23
Family unit	2.52	1.49	5.51***	1.76	1.51	1.67†
Total	2.34	1.73	5.52***	1.91	1.74	1.94*
Neuroticism	19.44	11.01	5.50***	14.06	11.14	2.08*

Significance of differences: * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

†As the numbers of patients with postoperative psychiatric disturbance were low statistical trends ($p<0.10$) are indicated thus.

TABLE II—Relation between preoperative measures (assessed four weeks before sterilisation) and postoperative dissatisfaction. (Figures are mean scores)

	Six months after sterilisation			18 months after sterilisation		
	Dissatisfied (n=15)	Not dissatisfied (n=175)	t	Dissatisfied (n=21)	Not dissatisfied (n=172)	t
Present state examination:						
Total	7.53	1.62	4.54***	6.43	3.08	2.39*
Profile of mood states:						
Anger	3.53	3.67	0.16	3.67	3.64	0.04
Tension	8.53	6.73	1.49†	8.24	6.69	1.49†
Depression	3.80	3.12	0.52	4.57	3.04	1.38
Fatigue	6.73	5.68	1.02	7.24	5.52	1.95*
Vigour	12.87	10.94	1.83†	11.62	11.01	0.66
Total	35.47	30.03	1.34	35.33	29.78	1.59†
Social adjustment scale:						
Work	1.55	1.41	1.41	1.59	1.41	2.24*
Housework	1.72	1.67	0.39	1.82	0.64	0.41
Social and leisure	2.01	1.88	1.05	2.05	1.87	1.70†
Extended family	2.10	1.78	3.11**	1.95	1.79	1.74†
Marital	1.89	1.89	0.02	2.00	1.88	0.93
Parental	1.82	1.70	0.94	1.63	1.71	0.78
Family unit	1.89	1.50	2.46*	1.73	1.51	1.58†
Total	1.89	1.74	1.54†	1.88	1.74	1.68†
Neuroticism	13.40	11.24	1.67†	12.88	11.24	1.46†

Significance of differences: * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

†As the numbers of patients with postoperative psychiatric dissatisfaction were low statistical trends ($p<0.10$) are indicated thus.

subscores; and neuroticism as measured by the Eysenck personality inventory. Also (not shown in the table), a significantly greater proportion of psychiatric cases had a history of referral to a psychiatrist ($\chi^2=5.14$, $df=1$, $p<0.05$). At the 18-month follow-up psychiatric cases still had higher scores, but at lower levels of significance, for the preoperative measures of present state examination total score; profile of mood states total score (but only two subscores); social adjustment total score (but only one subscore); and neuroticism as measured by the Eysenck personality inventory.

Regret—Table II shows that there were fewer significant associations between postoperative regrets and preoperative measures. Nevertheless, at both the six-month and 18-month follow-ups regret was significantly associated with the preoperative total score on the present state examination and a few of the subscores on the profile of mood states and social adjustment scale. Also (not shown in the table), at both follow-up assessments a significantly greater proportion of

under 30 were psychiatric cases as assessed by the present state examination ($\chi^2=5.14$, $df=1$, $p<0.05$). The explanation for this was that among patients under 30 the proportions of psychiatric cases were preoperatively 16%, at six months 0%, and at 18 months 26%; whereas among patients aged 30 and over the corresponding proportions were 10%, 5%, and 7%. The actual numbers of psychiatric cases aged under 30 however, were three, nil, and five respectively. These small numbers mean that no firm inferences may be drawn from this finding. Similarly, social class was not associated with psychiatric outcome preoperatively or at the six-month follow-up. Eighteen months postoperatively, however, a significantly greater proportion of psychiatric cases were from social classes IV and V ($\chi^2=7.55$, $df=2$, $p<0.05$). There was no significant association between parity and psychiatric outcome.

Regret—At neither follow-up was there any significant association between the expression of regret and age, social class, or parity.

PATIENTS WHO DID NOT PARTICIPATE

On completion of the 18-month interviews information was obtained from the general practitioners and gynaecological case notes of the 33 patients who did not participate in the study. Before operation this group did not differ significantly from those interviewed in age, parity, social class, obstetric history, previous contraceptive practice, psychiatric history (none of the 33 was known to have consulted a psychiatrist at any time), or frequency of consulting their general practitioner in the preceding year for either psychiatric or physical complaints. Postoperatively the two groups did not differ significantly in frequency of consulting their general practitioner for psychiatric, gynaecological, or other physical complaints. Moreover, none of the patients in this group had expressed any dissatisfaction with the operation to their general practitioner. Thus there was no evidence that the non-participants in the study differed in any important way from the participants. Indeed, the only significant difference was that a greater proportion of the non-participants were in full-time employment ($\chi^2=20.9$, $df=1$, $p<0.001$), and this may explain their reluctance to take part.

Discussion

Essentially there were five main findings. Firstly, in terms of psychiatric health our group of patients when compared with a sample of women from the general population were no different before sterilisation, significantly better six months post-operatively, and no different 18 months postoperatively. Secondly, as judged by the present state examination there was no evidence that any postoperative psychiatric disturbance could be attributed to sterilisation. Of 180 patients who were not psychiatric cases before sterilisation, only two (1.1%) were cases at the six-month follow-up and 12 (6.7%) at 18 months. Although no data are available from a control population, it is unlikely that the latter figure is higher than the proportion of "new" cases that might be expected after an interval of 18 months in women not undergoing sterilisation. Thirdly, after sterilisation sexual intercourse was reported as more enjoyable by over half the patients. Fourthly, some dissatisfactions concerning sterilisation were expressed by 15 patients (7.9%) at the six-month follow-up and by 21 (10.9%) at 18 months. The numbers wishing that they had not had the operation were five (2.6%) and eight (4.1%) respectively. Fifthly, psychiatric disorder after sterilisation was significantly more common in patients whose psychological and social functioning had been impaired before the operation. This was also the case for postoperative regret, but to a lesser degree.

These findings are in sharp contrast with those of some earlier studies, which reported considerably higher rates of psychiatric morbidity,^{3 11} psychosexual dysfunction,^{4 12} and regret.^{3 5} The explanation for this probably lies in differences in sampling and research methods. In our study the sample contained only patients receiving elective interval sterilisation, while in earlier studies the samples consisted mainly of patients sterilised for a combination of high parity and medical reasons, and interval procedures were uncommon. In addition, our study differed in being prospective, using standardised measures, and having high rates of follow-up.

Two recent British studies have pointed to findings broadly similar to ours. In Dunfermline a gynaecologist conducted a retrospective survey of 485 women sterilised up to 10 years previously.¹³ The study was concerned mainly with gynaecological health, but inquiries were made about personal reactions. Deterioration in mental health after the operation was reported by 6.4%, regret over having had the operation by 5%, and a worse sex life by 10%. The second study was carried out in Dundee.¹⁴ One year after sterilisation inquiry by postal questionnaire showed that 15% of patients were probable psychiatric cases according to the general health questionnaire, a proportion no greater than might be expected in the general population; 8% reported reduced sexual satisfaction and 3% regret.

We emphasise that the findings from the present study apply only to patients sterilised in Oxford, all of whom underwent

elective interval procedures. Before the operation psychiatric morbidity in this group was low. In other populations selection procedures may differ and preoperative morbidity may be higher, so that postoperative sequelae may be different.

With this proviso our main conclusion was that there was no evidence that elective interval sterilisation increased the risk of psychiatric disturbance up to 18 months after the operation. Two groups of patients—those who were psychiatrically disturbed postoperatively and those who expressed regret after the operation—had higher preoperative levels of psychiatric and social dysfunction when compared with other patients. This suggests that, after an interval of 18 months, these two groups of patients might have been equally disturbed or dissatisfied if they had not received sterilisation.

Eighteen months is a fairly short follow-up. It would be desirable to carry out a four- or five-year follow-up, and we hope to do so. After such an interval it would be difficult to establish an association between sterilisation and any identified psychiatric, sexual, or social dysfunction. The possibility of an increased risk of psychiatric disorder in younger patients, however, could be re-examined. At a late follow-up it would also be possible to assess the extent of regret in the whole sample.

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MEDICINES APPROPRIATED TO THE WOMB—These, physicians call *Hystericals*, and to avoid multiplicity of words, take them in this discourse under that notion. Take notice that such medicines as provoke the menses, or stop them when they flow immoderately, are properly hystericals, but shall be spoken to by and by in a chapter by themselves. As for the nature of the womb, it seems to be much like the nature of the brain and stomach, for experience teacheth that it is delighted with sweet and aromatic medicines, and flies from their contraries. For example: a woman being troubled with the fits of the mother, which is drawing of the womb upward, apply sweet things, as Civet, or the like, to the place of conception, it draws it down again; but apply stinking things to the nose, as Assafoetida, or the like, it expels it from it, and sends it down to its proper place. (Nicholas Culpeper (1616-54) *The Complete Herbal*, 1850.)