

# CLOSURE OF PERITONEUM AT LAPAROTOMY — A SURVEY OF GYNAECOLOGICAL PRACTICE

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*Background.* The traditional practice of gynaecological surgeons has been to close the peritoneal surfaces at laparotomy. Experimental and clinical trials have shown no advantage associated with closure of peritoneum. The objective of this study was to determine the attitude and practice of gynaecologists regarding peritoneal closure at laparotomy.

*Methods.* Questionnaires were faxed to, or telephonic interviews conducted with, 145 registered gynaecologists in Gauteng concerning their practices of peritoneal closure or non-closure at laparotomy. One hundred and one respondents replied and all data were entered onto a database (Epi-Info 6) for analysis.

*Results.* The response rate was 70% (101/145). Peritoneal closure was performed more frequently by private obstetricians and gynaecologists than by those who work either part-time or full-time in government institutions. Significantly more respondents in private practice than those who practise in government institutions close parietal peritoneum during caesarean section (92% v. 58%). The same trend was noted for abdominal hysterectomy (92% v. 61%, respectively). Restoration of anatomy (39% in private practice v. 27% in government institutions) and prevention of adhesion formation (36% in private v. 30% in government service) are the two most important reasons given by both groups for closure of peritoneal surfaces.

*Conclusion.* The majority of specialists close peritoneal surfaces during the various surgical procedures in obstetrics and gynaecology, despite evidence that this practice does not improve surgical outcome.

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Closure of peritoneal incisions during laparotomy has traditionally been the practice of surgeons over the last century. This practice is summed up by the now famous statement of Smith in 1895: 'Sinister results, which we seek to avoid, arise when we leave raw surfaces to which intestines adhere and cause obstruction. To cover such a surface by peritoneum would, according to published statistics, save nearly 2 percent of the deaths after abdominal operation.'<sup>1</sup> There are animal and clinical trials to contradict the established belief of the advantages of peritoneal closure. Reasons that have been cited for peritoneal closure, apart from preventing adhesion formation, include prevention of wound infection, restoration of anatomy, approximation of tissues for healing, and reduction in the risk of wound herniation or dehiscence.<sup>2</sup>

Experimental animal models have shown no advantage of peritoneal closure over non-closure as regards adhesion formation. Kapur *et al.*<sup>3</sup> performed laparotomy closure in rats with and without peritoneal suture. The incidence of adhesions to the parietal peritoneum was significantly higher when the peritoneum was sutured, and the tensile strength was similar whether or not the peritoneum had been sutured. In a similar study by Kyzer *et al.*,<sup>4</sup> using microscopic and macroscopic examination, a significantly higher amount of adhesion to scar developed when the peritoneum was closed. O'Leary *et al.*<sup>5</sup> investigated the potential contribution of suturing and sepsis to adhesion formation in animals undergoing laparotomy when peritonitis was produced in the laboratory animal models. Suturing the peritoneum caused a statistically significantly higher incidence of adhesions to the wound and non-closure did not comprise wound strength. Milweczyk,<sup>6</sup> Swanwick *et al.*<sup>7</sup> and Macdonald *et al.*<sup>8</sup> in separate studies on rabbits and horses, also reported fewer adhesions with the peritoneum left unsutured.

A review of human clinical trials has not shown any deleterious effect if the peritoneum is left unclosed, and the trend generally favours non-closure. No significant short-term differences in postoperative complications or pain scores were demonstrated in three randomised controlled trials of vertical incisions in general surgery with closure of peritoneum versus non-closure.<sup>9-11</sup> In operative gynaecology, randomised controlled trials of non-closure of peritoneum versus closure in abdominal hysterectomy,<sup>12</sup> vaginal hysterectomy,<sup>13</sup> ovarian cancer surgery<sup>14</sup> and cervical cancer surgery<sup>15</sup> found no significant short-term morbidity when the peritoneum was left unclosed. Physiologically, Buckman *et al.*<sup>16</sup> showed that deperitonealised surfaces, which have not been traumatised, heal without permanent adhesions before organisation can occur. Peritoneum that has been made ischaemic by grafting or tight suturing not only loses its ability to lyse fibrin, but may also actively inhibit fibrinolysis by normal tissues. There is observational evidence that peritoneal defects demonstrate mesothelial integrity within 48 hours and indistinguishable healing with no scar formation within 5 days.

The aim of this survey conducted among gynaecologists in

an urban region of South Africa was to assess their attitudes and practices concerning closure or non-closure of peritoneum at laparotomy.

## METHODOLOGY

A list of 267 registered gynaecologists in Gauteng, South Africa, was obtained from *South African Obstetricians and Gynaecologists, 1996/97*, a publication of the South African Society of Obstetricians and Gynaecologists. Of those in the register whose telephone numbers or addresses could be traced, 145 were faxed or handed questionnaires to complete. Some were telephonically interviewed using the questionnaire format. The questions enquired whether respondents practised in government health establishments, private practice, or both. They were also questioned regarding their attitudes and practices towards peritoneal closure during different obstetric and gynaecological procedures (caesarean section, abdominal hysterectomy, laparotomy for benign conditions, laparotomy for malignant conditions and tubal reconstructive procedures). If they did close the visceral or parietal peritoneum or both, they were asked to indicate the most important reason(s) in order of preference. The data were analysed using the Epi-Info 6 statistical software package. The trial was approved by the Committee for Research on Human Subjects of the University of the Witwatersrand.

## RESULTS

Of the 145 specialists who were sent questionnaires, 101 (70%) responded; 2 specialists did not perform laparotomy and 1 specialist had retired. The results are shown in Tables I and II.

Closure of peritoneal surfaces is practised more frequently by private specialists than by those who work part- or full-time in government health establishments. The differences were statistically significant for visceral and parietal peritoneum for all procedures, with the exception of visceral peritoneum at caesarean section.

Restoration of anatomy and prevention of adhesion formation are the two most important reasons for closing peritoneum given by the specialists in both groups (39% and 36%, respectively, for those in private practice; 27% and 30%, respectively, for those in government practice). Other reasons mentioned included avoidance of fistula formation and prevention of malignant cell implantation in the anterior abdominal wall in oncological surgery, prevention of bowel complication if radiotherapy is anticipated, the surgeon's habit, and control of haemostasis.

## DISCUSSION

The trend towards non-closure favours specialists who work full-time or part-time in the government services. This finding

**Table I. Number of specialists who always close peritoneal surfaces during various surgical procedures (N = proportion of those who answered the question)**

Procedure	Peritoneum	Private		Government and government/private		P-value
		N	%	N	%	
Caesarean section	Visceral	51/61	84	21/33	64	0.2906
	Parietal	55/60	92	19/33	58	0.0010
Abdominal hysterectomy	Visceral	34/63	54	10/32	31	0.0358
	Parietal	57/62	92	20/33	61	0.0002
Tubal surgery	Parietal	46/55	84	14/24	58	0.0155
Laparotomy (benign lesions)	Parietal	58/62	94	17/31	55	0.0003
Laparotomy (oncology)	Visceral	25/52	48	5/27	19	0.0003
	Parietal	41/55	75	14/28	50	0.0001

**Table II. The most important reason(s) for closure of either or both peritoneal surfaces (N = number of those who answered the question)**

Reasons for closure of peritoneal surfaces	Private		Government and government/private		P-value
	N = 64	%	N = 34	%	
Restoration of anatomy	25	39.1	9	27.3	0.2489
Prevention of infection	0	0	1	3.0	0.1616
Improvement of wound integrity	5	7.8	6	18.2	0.1270
Prevention of adhesions	23	35.9	10	30.3	0.5789
Multiple reasons	6	9.3	1	3.0	0.2525
Not answered	5	7.8	4	12.1	0.4905
No obvious reason	0	0	1	3.0	0.0934
Other reasons	0	0	2	6.1	0.0534

could be interpreted as suggesting that specialists in government practice are exposed to more or different forms of continuous medical education than those solely in private practice. Another possibility may be that the latter are more concerned that a departure from 'traditional' practice may lead to litigation in case of complications. Prevention of adhesion formation is a known prerequisite for successful tubal reconstruction procedures. Of the respondents, 84% in private practice and 59% in government and a combination of private/government practice closed the parietal peritoneum after tubal reconstructive surgery. Tulandi *et al.*<sup>17</sup> studied the effect of peritoneal closure after reproductive surgery by Pfannenstiel incisions, clinically and by second-look laparoscopy. The laparoscopic findings of 63 patients in the group with peritoneal closure and 57 patients in the group without closure were compared with those in 150 infertile women with no history of abdominal surgery (control group). Among the patients with peritoneal closure, 22% had adhesions in contrast to 16% of patients without closure. No adhesions were found in the control group. No difference was found in the length of hospital stay, the incidence of wound complications, and other postoperative complications in the patients with ( $N = 168$ ) or without ( $N = 165$ ) peritoneal closure.

The majority of respondents closed either or both peritoneal surfaces while performing caesarean section. Currently available evidence raises questions concerning the routine use of peritoneal closure as standard practice in caesarean section.<sup>18</sup> Reduced need for postoperative analgesia, a quicker return of bowel function and shorter operating and anaesthesia times were found when both visceral and parietal or only parietal peritoneum were left unsutured.<sup>12,19,20</sup> The incidence of febrile morbidity, cystitis and need for antibiotic were significantly greater when the peritoneum was closed,<sup>12</sup> and mean hospital stay was shorter after non-closure. Irion *et al.*<sup>21</sup> reported earlier resolution of postoperative ileus and shortening of operative time with non-closure of visceral and parietal peritoneum. Based on the review of trials on caesarean section, clinical guidelines were produced under the direction of the Scientific Advisory Committee of the Royal College of Obstetricians and Gynaecologists. Non-closure of peritoneum was strongly recommended during caesarean section — a 'Grade A Recommendation'.<sup>19</sup>

There is no evidence to support the practice of peritoneal closure in an attempt to improve wound integrity or to prevent infection.<sup>17,20,22</sup> The majority of respondents in this survey closed the peritoneum while performing gynaecological surgery.



Randomised controlled trials have been conducted to evaluate the need for closure or non-closure of peritoneum during gynaecological oncology surgery, and vaginal/abdominal hysterectomy for benign conditions. With the peritoneum left open, there were either smaller numbers of postoperative complications<sup>12</sup> or no complications,<sup>13</sup> reduced adhesion formation and reduced febrile morbidity.<sup>14,15</sup> Hugh *et al.*<sup>11</sup> found that single-layer closure of superficial parts of the rectus sheath was quicker, less costly, and theoretically safer than separate closure. The Advisory Committee of the Royal College of Obstetricians and Gynaecologists also strongly recommended peritoneal non-closure during gynaecological surgery.<sup>19</sup>

The advantages of non-closure over closure of peritoneum have been documented for animal experiments and human clinical trials; however, it must be noted that some of the clinical trials have weak methodologies, allocation being quasi-randomised rather than randomised.<sup>18</sup> One thing that is certain about peritoneal closure is that the operation takes longer and more suture material is used. While there is no evidence that peritoneal closure improves outcome, there is a general trend towards poorer outcome. Although few trials have addressed late sequelae of non-closure of peritoneum, available evidence does not justify routine suturing of peritoneal surfaces. There is still a place for properly designed multicentred studies to address long-term complications in some of the procedures performed by gynaecological surgeons.

The limitation of this survey is that not all registered gynaecologists and obstetricians were interviewed. However, the response rate of 70% is well above the norm for such surveys.

## CONCLUSION

Most gynaecologists in Gauteng province continue to close the peritoneal surfaces despite lack of evidence that it improves surgical outcome. Although the long-term benefit of non-closure of peritoneum is yet to be conclusively proven in all major gynaecological procedures, there is lack of evidence to justify routine peritoneal closure at laparotomy. It might just be that 'old habits die hard'. There is a need actively to extend continuing medical education programmes to obstetricians and gynaecologists, especially those in the private medical services. The need for health practitioners to change their practice according to evidence-based principles cannot be over-emphasised.

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