Risk factors for complicating infections after cesarean section

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Summary: In this study of 906 women who underwent Cesarean Section without the use of an antibiotic prophylactic it has been confirmed that age, labour in course and the premature rupture of the membrane are clinical parameters that are statistically significant for unspecified fever/endometritis or for infections of the wound and that hemoglobin and hematocrit values below 9 gr/dl and at 35% post-operation are significant for infections of the wound.

13.2% women had complicating infections of which 1.3% were infections of the wound, 0.6% were endometritis, 7.2% were unspecified fever and 4.1% were urinary infections.

The Authors show that preventive measures in some areas could be as effective as chemoprophylaxis.

INTRODUCTION

Complicating infections after Cesarean Section (CS) have always aroused controversy in obstetrics.

The risk of infection with CS in 5-10 times higher than with normal, vaginal births.

High temperature (29-95%) and endometritis (10-45%) are generally linked to obstetric pathologies, and the extreme variability in the percentages of both is, above all, due to the different criteria adopted for evaluating them ([1, 2]).

In the last decade, there has been an increase in the number of CS carried out. This is due to more careful monitoring of mother-foetus, to the fact that many Centres have stopped doing operations for vaginal birth, to a more frequent repetition of CS with the same woman and, last but not least, to the fact that the average age of women, especially of primigravida women, is rising ([3, 4]).

Complicating infections are due to the combined action of three factors: 1) bacterial contamination; 2) the organism's defence mechanisms; 3) environmental factors.

Accurate identification of potential risk factors is necessary as a starting point for reducing the incidence of such infections. Many authors have described the efficiency of chemoprophylaxis in reducing complicating infections: overall incidence falls from 40.5% to 13.9%, and that of infections of the wound from 22.7% to 3.95% ([5, 6, 7, 8, 9, 10]).

However, the numerous, and very valid, objections raised to the indiscriminate use of antimicrobial drugs for prophylactic ends should be highlighted. These are based on three main points: 1) the risk of creating chemoresistant strains of

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bacteria; 2) the toxicity of the drugs themselves; 3) the cost-benefit relationship [11, 12, 13].

It should be underlined here that rigorous asepsis and correct surgical techniques are still fundamental for surgical success.

The aim of this study is to evaluate some parameters which may influence the incidence of complicating infections.

MATERIALS AND METHODS

The study was carried out using a sample of 906 women who had undergone CS at the Gynaecological and Obstetric Clinic of the University of Padua during the three year period 1990 - 1992 (Table 1).

Women who underwent antibiotic prophylaxis (premature rupture of the membrane, short-term pre-operations) were excluded from the sample.

The protocol adopted included:

– getting the patient up and removing the vesica catheter 24 hours after the operation, hemato-chemical checks and urinoculture 24 - 36 hours after the operation;

– removal of stitches and release of the patient 6 days after the operation;

Table 1. – *Main reasons for cesarean section in the 906 cases studied.*

	No: cases	% of all cases
Previous CS	220	24.2
Mechanical dystocia	106	11.6
Retarded growth	102	11.2
Acute fetal sufferance	100	11.0
EPH gestosis	92	10.1
Dynamic dystocia	86	9.4
Podalic presentation	60	6.6
Progravid pathology	56	6.1
Hepatogestosis	30	3.3
Multiple birth	26	2.8
D.P.P.N.I.	14	1.5
Polyhydramnios	6	0.6
Prom	4	0.4
Fetal hydrocephalus	2	0.2
Placenta previa	2	0.2
Total	906	100.0

– taking a sample for hemoculture should the temperature rise at least 2 points > 38° and, in the presence of bronchial complications, a Chest X-Ray and culture of expectoration;

– examination, by culture, of secretions in cases where the wound was infected.

All the puerpurants were checked in the post-operative period in order to evaluate the following complicating infections:

1) fever not otherwise specificed (nos); persistent continuous or intermittent temperature > 38°, for more than two days, with no signs of local, general or laboratory identified infection;

2) third degree, or above, (according to Diognigi) infection of the surgical wound;

3) signs of endometritis, fever, hypogastric pain, odoriferous lochia, uterine subinvolution, positive culture of lochia;

4) signs of urinary tract infection, fever, dysuria, positive urinoculture > 105 facteria/ml.

The possible risk factors taken into account were:

1) age > 35 years;

2) no. of days of admission to hospital prior to the operation (0.1, > 2);

3) primary nature of operation;

4) obesity;

5) pre and post operative htc < 35%;

6) pre and post operative hb < 9 d/dl;

7) labour in course;

8) amniorrhexis and length of time (> 8 hours);

9) premature rupture of membranes and length of time (> 8 hours);

10) no. of vaginal examinations > 3 of breaking of the membranes (untimely or rexi).

Each parameter was correlated with hyperpyrexia of unidentified fever/endometritis and with infections of the surgical wound.

Statistical analysis of the results was carried out using Chi squared or Fisher test.

RESULTS

Table 2 shows that of the 906 cases studied 13.2% (122) were affected by complicating infections. Of these 7.2% were due to unidentified fever, 4.1% to urinary infections, 1.3% to infections of the surgical wound and 0.6% to endometritis.

In Table 3 women with either hyperpyrexia of unidentified fever/endometritis or with infections of the surgical wound are correlated with clinical or hematic pa-

Table 2. – *Post-operative complicating infections (122/906 = 13.2%).*

	No: cases	% of all cases
Non-specific fever	66	7.2
Urinary infections	38	4.1
Infection of wound	12	1.3
Endometritis	6	0.6
Total	122	13.2

rameters considered to be potential risk factors.

Of the 8 clinical parameters considered one, (age >35 years), proved to be significant for hyperpyrexia and two, labour in course and premature rupture of the membrane), were significant for infection of the surgical wound.

An added risk factor for infection of the wound was the number of hours (more than eight) in cases of premature rupture of the membrane.

As regards hematic parameters there was significance for post-operative hematocrit and hemoglobin values which were below 35% and 9 gr/dl respectively when correlated with infection of the wound.

DISCUSSION

Risk factors for complicating infections in CS have been extensively studied and many authors agree that both labour and the premature rupture of the membrane represent major risk factors .

Our study has confirmed this correlation with regard to infection of the wound and it is interesting to observe that this complication is significantly present in cases of premature rupture of the membrane (p = 001), while there is no case among women who underwent amniorrhexis. This is probably due to the serious condition of the fetus in cases of premature rupture of the membrane which required an emergency operation.

Table 3. – *Evaluation of risk factors for hyperpyrexia and infection of the wound in 906 cases.*

	HYPERPYREXIA				INFECTION OF THE WOUND		
	no:	no:	%	p<0.05	no:	%	p<0.05
Labour							
underway	240	20	8.3	n.s.	8	3.3	0.0038
absent	666	52	7.8		4	0.6	
HCS post-CS							
< 35%	618	54	8.7	n.s.	12	1.9	0.0098
> 35%	288	18	6.2		0	0.0	
Premature rupture of the membrane							
present	66	4	6.0		4	6.0	0.01
absent	840	68	8.0		8	0.9	
if present							
< 8 hours	36	4	11.1		0	0.0	
> 8 hours	30	0	0.0		4	13.3	0.038
Amniorrhexis							
yes	96	8	8.3	n.s.	0	0.0	
no	810	64	7.9		12	1.4	
if present							
< 8 hours	70	8	11.4		0	0.0	
> 8 hours	26	0	0.0		0	0.0	
No: Vaginal examinations - Rupture of membrane (untimely/rexus)							
< 3	66	10	15.1		0	0.0	
> 3	96	2	2.2		4	4.5	n.s.
HGB post-CS							
< 9 gr/dl	100	10	10.0	n.s.	4	4.0	0.036
> 9 gr/dl	806	62	7.6		8	0.9	
AGE							
< 35	742	52	7.0		10	1.3	
> 35	164	20	12.1	0.039	2	1.2	
Obesity							
present	354	36	10.6	n.s.	3	0.8	
absent	552	36	6.5		9	1.6	
No: Days hospital stay before CS							
0	294	24	8.1		2	0.6	
1	312	26	8.3		4	1.2	
> 2	300	22	7.3		6	2.0	n.s.
Primary CS	662	56	8.4	n.s.	10	1.5	n.s.
Repeated CS	244	16	6.5		2	0.8	
HCS pre-CS							
< 35%	510	36	7.0		8	1.5	n.s.
> 35%	396	36	9.0		4	1.0	
HGB pre-CS							
< 9 gr/dl	60	2	3.3		2	3.3	n.s.
> 9 gr/dl	846	70	8.2		10	1.1	

A time period longer than 8 hours did not influence hyperpyrexia even though it was statistically significant for infection of the wound ($p=0.039$).

Age over 35 years was significant for hyperpyrexia ($p=0.039$).

In the post-operative stage hemoglobin levels < 9 gr/dl and hematocrit levels $< 35\%$ were significant for infection of the wound ($p < 0.05$).

These parameters are indirect indications of excessive hematic loss during the operation. Hence, in this instance, the length of time taken for the operation and, also important, the experience of those attending the patient, are crucial.

Complicating infections appeared in 13.2% of all cases. Of these 1.3% were due to infections of the wound, 0.6% to endometritis, 7.2% to unidentified fever and 4.1% to urinary infections. If these latter, consequent complications, are excluded, the incidence of complicating infections drops to 9.1% of all cases.

The low incidence of complicating infections and the possibility of identifying the sources of such infections raise doubts about the of indiscriminate and systematic use of antibiotic prophylaxis especially if one considers that these do not offer a definitive solution to the problem of post-surgical infection.

In fact, while the efficiency of chemical prophylactics has been proved for infections of the wound the same cannot be said for later infections and for unidentified fever.

Today there is a tendency to consider the incidence of infections of the wound as being the most important, if not the only, evaluatory and orienting parameter for chemical prophylactics. In this study, the low percentage of women affected by infection of the wound (1.3%) certainly would not have justified the routine administration of antibiotics, and the same holds true for cases of endometritis (0.6%).

Furthermore, these data confirm that preventive measures such as 1) vaginal swab taken before the operation; 2) identification of cases at risk; 3) use of correct surgical techniques (hemostasis); 4) prudent use of drains; 5) specific antibiotic therapies are as valid as more general use of chemoprophylactics and have the added advantage of cutting costs.

Lastly, two points should be emphasised: the operation should be carried out in a theatre reserved for CS, and in 70% of cases CS is carried out by choice.

However, wherever it is not possible to meet the reuired conditions then a chemoprophylactic should be administered, but such use should not be offered as an excuse for not adhering to the requirements for surgical and operating asepsis which are indispensible in reducing the likelihood of complications.

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