Diagnosis of dystocia and management with cesarean section among primiparous women in Ottawa-Carleton

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We carried out a chart review study to determine the rate of diagnosis of dystocia (abnormal progress) and the use of cesarean section to treat dystocia among 3887 primiparous women who gave birth to a single baby in the vertex presentation at four hospitals in Ottawa-Carleton in 1984. Of the 3740 women who had some labour 1127 (30.1%) were given a diagnosis of dystocia. Cesarean section for dystocia was done during all phases of labour (41% of procedures in the latent phase, 38% in the active phase and 21% in the second stage). The cesarean section rate varied among the hospitals from 11.8% to 19.6%. A total of 75% of the cesarean sections were for dystocia, disproportion or failed induction. The findings suggest that cesarean section is being done for disproportion without a trial of labour beyond the latent phase and for dystocia in the absence of fetal distress. If these practices were modified the cesarean section rate could be reduced from 16% to about 8%, the rate found in some other centres and that observed in Canada in the early 1970s.

Revue sur dossiers des taux de dystocie et de césarienne pour dystocie chez 3887 primipares ayant accouché dans quatre hôpitaux d'Ottawa-Carleton en 1984; on exclut les grossesses gémellaires et ne retient que les présentations du sommet. On a posé le diagnostic de dystocie chez 1127 (30,1%) des 3740 mères qui ont présenté au moins un début de travail. La césarienne pour dystocie se pratique à toutes les phases du travail: 41% des interventions à la phase latente, 38% à la phase active, 21% pendant la descente. Le taux global de césarienne varie, d'un hôpital à l'autre, de 11,8% à 19,6%. De l'ensemble de ces interventions 75% sont motivées soit par une dystocie, soit par une disproportion céphalo-pelvienne (DCP), soit par un essai infructueux de provocation du travail. Nos trouvailles font croire qu'on a recours à la césarienne pour une DCP sans essai du travail au-delà de la phase latente et pour une dystocie sans souffrance foetale. La modification de ces manières de faire permettrait de ramener le taux global de césarienne de 16% à environ 8%. Ce dernier taux, qui s'observe actuellement dans d'autres centres urbains, valait pour l'ensemble du Canada au début des années 1970.

The tripling of the cesarean section rate in Canada and the United States since the early 1970s has caused concern among both the medical community and the general public. If the cesarean section rate is to be controlled, the causes contributing to its rise must be examined. Analysis of US and Canadian data suggests that about 31% of cesarean sections are performed for dystocia (abnor-

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mal labour).[1-3] Among primiparous women the proportion is over 50%.[1] Furthermore, changes in the diagnosis and management of dystocia are thought to have contributed to the rise in the cesarean section rate.[1]

Dystocia is a "very complex, highly inclusive concept".[4] Although its definition — abnormal progress in labour — seems simple, there is no consensus as to what "abnormal progress" means. In addition, although several treatments for dystocia have been proposed, there has been little evaluation of the efficacy of these interventions in improving the progress of labour or in reducing the incidence of poor perinatal outcome.[1] If physicians are diagnosing abnormal progress of labour inappropriately or are not using other treatments before resorting to cesarean section, these practices may be contributing to the rising cesarean section rates.

We carried out a study to determine the rate of diagnosis of dystocia and the rate of cesarean section to treat dystocia among primiparous women who gave birth to a single baby in the vertex presentation in Ottawa-Carleton.

Methods

There are about 9500 births per year in the Ottawa-Carleton region, 98% occurring at five local hospitals. The four hospitals participating in the study included two tertiary care hospitals with nursing, medical student and resident teaching (hospitals A and B) and two community hospitals (hospitals C and D). The fifth hospital had such a low proportion of the births (6%) that we decided not to include it in the study.

The caseroom logbook was used to identify all primiparous women who gave birth to a single baby in the vertex presentation during 1984. The hospital charts of these women were then briefly reviewed to identify those who had been given a diagnosis suggesting dystocia. The charts of these women were examined in detail to record information on maternal and fetal characteristics, course of labour, interventions, mode of delivery, Apgar scores, type of physician and time of birth. One trained nurse extracted all the data from the hospital charts. We chose the chart review method so that the study itself would not influence physician behaviour.

Many terms have been used by clinicians and researchers to describe dystocia. To avoid missing a diagnosis of dystocia, we included a woman in the clinical dystocia group if any of the following words or similar expressions were present in her hospital chart: fetopelvic disproportion, cephalopelvic disproportion, abnormally small maternal pelvis, obstructed labour, contracted mid-pelvis, uterine inertia, cervical inertia, abnormal forces of labour, lack of labour progress, long labour, abnormal progress of labour, prolonged latent stage, prolonged second stage, prolonged labour, prolonged first stage, prolonged active phase, protracted active phase, prolonged deceleration phase, secondary arrest of dilatation, transverse arrest of descent, arrest of active labour, arrest of active phase or prolonged second stage of labour.

Women who met any of the following criteria were not included in the study: no fetal heart sounds heard at the time of admission to the caseroom, diagnosis of prolapsed cord or diagnosis of antepartum or intrapartum hemorrhage. These criteria excluded women who *a priori* might not be expected to have a normal labour and delivery or who had a complication independent of the length of labour that would necessitate a cesarean section.

Both women who had spontaneous onset of labour and those whose labour was induced were included in the study. This allowed us to assess the contribution of dystocia to the cesarean section rate among the entire group of primiparous women who gave birth to a single baby in the vertex presentation.

The charts of 80 women (20 from each of two hospitals, 19 from the third and 21 from the fourth) were examined twice by the chart reviewer to assess the reliability of the chart review. The reviewer was unaware which charts were examined twice. In the brief review to identify cases of dystocia the same women were identified as having or not having a diagnosis of dystocia in all but two cases (2%). In the detailed chart review (34 charts) there were not more than two discrepancies (6%) for any of the variables that we studied.

We did not assess the validity of the information recorded in the chart. Since the purpose of the study was to assess the factors that the physician thought were present and that might have contributed to clinical decision-making, the validity of the physician's assessment was considered less important.

Definitions

Progress of labour: The labour curves (cervical dilatation over time) of all the women in the study were graphed. These curves were used to define the stage of labour during which a diagnosis of dystocia was made and a cesarean section done. The following criteria were used to divide labour into the various phases: latent phase, to 4 cm of dilatation; active phase, 4 to 10 cm of dilatation; and second stage, from 10 cm of dilatation to birth.[5] If there was no cervical measurement at 4 cm the active labour curve was extrapolated back to record the time at which 4 cm would probably have been reached.

Fetal distress: The terms used to describe fetal

distress, as determined from electronic monitoring of the fetal heart rate, that were recorded from the charts were grouped into possible and probable fetal distress.

- Possible fetal distress: isolated decelerations, thin meconium, tachycardia (160 beats/min or more), long-term loss of variability, smooth baseline.
- Probable fetal distress: scalp blood pH 7.24 or less, late decelerations with or without sustained tachycardia, pronounced and recurring decelerations, thick meconium, bradycardia, sinusoidal pattern.

Type of labour: Labour was classified as having been induced if oxytocin or prostaglandins were used or if the membranes were ruptured in the absence of contractions.

Data analysis

We analysed the data using the SPSS-X statistical package.[6] The data were checked extensively for errors and inconsistencies before analysis. Since the study included all women who gave birth during 1984, not just a sample, inferential tests to determine whether the differences observed between hospitals were due to sampling error were not necessary.

Results

A total of 9339 babies were born to 9222 women at the four hospitals in 1984. Of the 9222 women 3919 (42.5%) were primiparas who gave birth to a single baby in the vertex presentation. The charts of 3887 (99.2%) of these women were found and examined.

Most of the women (88%) were between 20 and 35 years of age. A total of 5.0% of the babies were born at more than 41 weeks' gestation, and 12.8% were born at less than 38 weeks. In all, 9.6% of the babies weighed more than 4 kg, and 1.2% weighed 4.5 kg or more. Labour was induced in 21% of the women. Over half the women had some intervention at birth, be it use of forceps (41.5%), vacuum extraction (1.7%) or cesarean section (16.4%).

Fig. 1 shows the labour course and birth outcome for the 3887 women. Overall, 1127 women (30.1% of those who had some labour) were given a diagnosis suggesting dystocia or disproportion: 392 (34.8%) in the latent phase only, 43 (3.8%) in the latent and active phases, 214 (19.0%) in the active phase only and 478 (42.4%) in the second stage only. Of the 1127 women 110 were given a diagnosis of dystocia in both the first and second stages of labour.

Cesarean section for dystocia was done during all phases of labour (Table 1). Overall, 41% of the cesarean sections were done during the latent phase of labour, 38% during the active phase and 21% during the second stage. The proportion of cesarean sections during the various stages of labour varied considerably among the hospitals.

Dystocia was an important factor contributing to the overall cesarean section rate among the study population (Table 2). Of the 637 women (16.4%) who had a cesarean section 404 (10.4% of all the women) were considered to have had disproportion or abnormal progress of labour as an indication for cesarean section. Another 41 (1.0%) had a failed induction, and 32 (0.8%) underwent elective cesarean section for disproportion. Thus, of all the cesarean sections 63% were for dystocia and 75% for dystocia, disproportion or failed induction. The cesarean section rate varied among the hospitals (Table 2). Much of the difference in the rates was

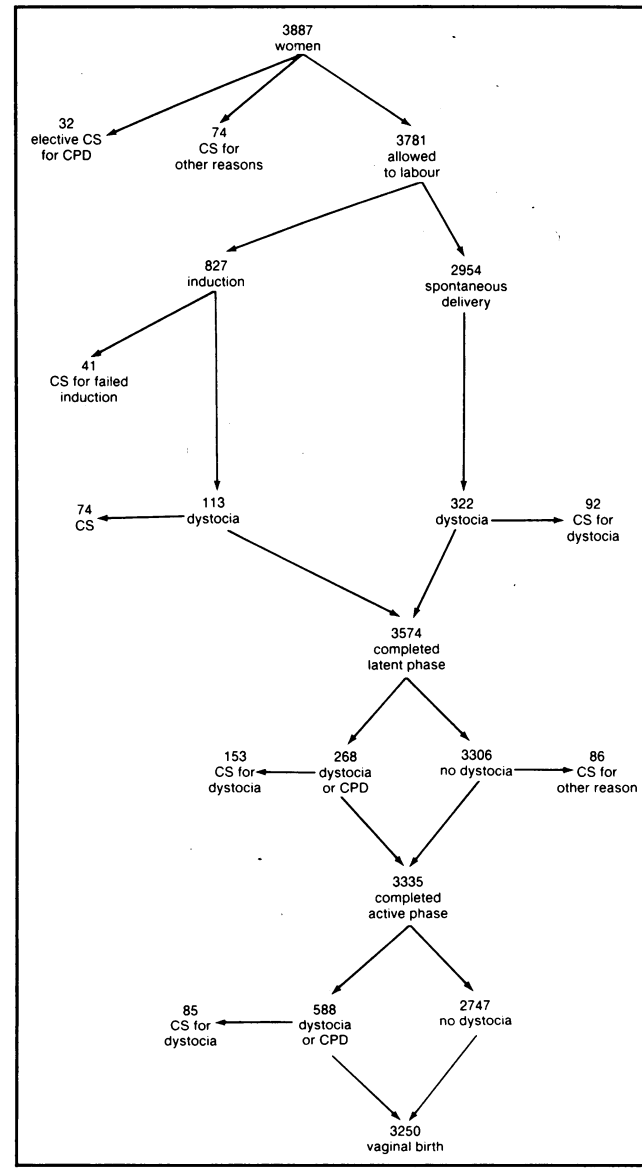

Fig. 1: Labour course and birth outcome among 3887 primiparous women with single baby in vertex presentation in Ottawa-Carleton in 1984. CS = cesarean section; CPD = cephalopelvic disproportion.

accounted for by the difference in the rates of cesarean section for dystocia alone, elective cesarean section for disproportion and cesarean section for failed induction. The two community hospitals (C and D) had the highest and the lowest cesarean section rates.

Discussion

It was necessary to have a method of collecting the data that would not influence the way physicians practised. However, one of the main concerns about a chart review study is whether the information in the chart is valid. This is not likely to have been a major problem in our study. The most important variables were cervical dilatation over time (used to define stage of labour), a diagnosis of dystocia or disproportion, a diagnosis of fetal distress and the type of birth. Each hospital used a standard form to record cervical dilatation over time. The nurses recorded when the examination was done, by whom and the amount of dilatation. We included many terms in the definition of dystocia to avoid missing a diagnosis. It is possible that a physician may have considered that labour was prolonged or that there was disproportion without writing it down, especially if he or she was not intending to do anything about it. This would mean that our estimate of the incidence of a diagnosis of dystocia would be an underestimate. However, if a cesarean section was done for this reason it would likely have been recorded as such. It is difficult to know whether the diagnosis of fetal distress was always recorded in the chart. However, if fetal distress was thought to be a reason for cesarean section it would likely have been recorded because the physician must record the reason for a cesarean section. The type of birth is always recorded because an operative report must be completed if there is a cesarean section.

Almost one-third of the women in our study were given a diagnosis of abnormal progress of labour or disproportion. This proportion is so high that one wonders whether the criteria used to define "normal" adequately reflect the actual variations in labour patterns among women. In addition, the variation in rates of cesarean section for dystocia among the hospitals, particularly the two community hospitals, which had similar populations, suggests

Table 1: Timing of cesarean section for dystocia among 3887 primiparous women with a single baby in the vertex presentation

Timing of cesarean section	Hospital; % of cesarean sections in each (and % of all women)*				
	A	B	C	D	All
Latent phase (n = 166)	45.5 (5.2)	13.3 (1.6)	51.3 (6.2)	58.1 (4.0)	41.1 (4.3)
Active phase (n = 153)	33.8 (3.9)	52.0 (6.2)	34.6 (4.2)	31.1 (2.1)	37.9 (3.9)
Second stage (n = 85)	20.8 (2.4)	34.7 (4.1)	14.1 (1.7)	10.8 (0.7)	21.0 (2.2)
Total (n = 404)	100.0 (11.5)	100.0 (11.9)	100.0 (12.1)	100.0 (6.9)	100.0 (10.4)

*The number of cases at each hospital is not recorded to protect the identity of the hospitals. The number of births at each hospital ranged from 647 to 1342, the number of cesarean sections from 74 to 154.

Table 2: Reasons for cesarean section as recorded in the hospital chart

Reason	Hospital; % of all women in each*				
	A	B	C	D	All
Dystocia alone (n = 295)	8.6	9.4	8.0	4.6	7.6
Dystocia with fetal distress (n = 86)	2.5	2.2	2.3	1.9	2.2
Dystocia with other reason (n = 23)	0.4	0.4	1.7	0.4	0.6
Failed induction (n = 41)	0.8	0.6	2.2	1.0	1.0
Elective for disproportion (n = 32)	0.7	0.2	2.0	0.7	0.8
Other (n = 160)	3.8	6.5	3.4	3.2	4.1
Total (n = 637)	16.8	19.2	19.6	11.8	16.4

*The number of cases at each hospital is not recorded to protect the identity of the hospitals.

that physicians may be using different approaches to treat dystocia.

The use of cesarean section to treat dystocia in the latent phase of labour needs to be carefully assessed, as 41% of the cesarean sections for dystocia in our study were done in this phase. Criteria for a normal duration of the latent phase are very difficult to define because it is so difficult to determine when effective labour starts. In addition, using a set amount of cervical dilatation to define the end of the latent phase for all women can be misleading. The women in our study entered the active phase (upswing of the labour curve) at anywhere from 3 to 5 cm of dilatation. It is probably more appropriate to use fetal distress rather than duration of labour as an indicator of an abnormal latent phase.

The use of induction must also be assessed. Labour was induced in 22% of the women in our study who were allowed to labour, and 14% of those in whom labour was induced had a cesarean section during the latent phase of labour. Thus, inductions that did not achieve active labour contributed 3% (115/3887) to the cesarean section rate for the study population (16.4%).

One of the objectives of the study was to identify the proportion of cesarean sections that may be most amenable to intervention other than cesarean section. If all the elective cesarean sections for disproportion and the cesarean sections for dystocia without fetal distress were eliminated the overall cesarean section rate for primiparous women with a single baby in the vertex presentation could drop from 16.4% to 8%. It is difficult to say whether in fact all these women would be able to have a vaginal delivery or whether fetal distress or other factors would appear later to necessitate a cesarean section. However, it does give some idea of the magnitude of the change in practice necessary to effect a meaningful change in the cesarean section rate.

Other centres do have cesarean section rates similar to the suggested 8%. The primary cesarean section rate among 2000 women in Chicago was reduced from 12% in 1985 to 7.5% in 1986–87 after an organized effort by physicians to control the cesarean section rate.[7] The largest change was a reduction in the rate of cesarean sections for dystocia. Fetal outcome did not differ significantly between the two groups. Sheehan[8] described the differences in the cesarean section rates between a population at a hospital in Ireland and another in the United States, both of which were similar to our population. The cesarean section rate in Ireland was 5.6%, compared with 12.3% in the United States. Fetal outcomes were not worse with the lower cesarean section rate.[8-10] One of the most interesting differences was that the Irish group defined the onset of labour as 4 cm of dilatation. Sheehan suggested that this criterion along with the extensive use of oxytocin and the limited use of the diagnosis of disproportion in the Irish group contributed to the differences in the cesarean section rates between the two groups.[8]

Conclusions

A high proportion of primiparous women with a single baby in the vertex presentation in Ottawa–Carleton are being given the diagnosis of abnormal progress of labour (dystocia), and cesarean section is used frequently to treat it. The diagnosis and treatment of dystocia is thus an important contributor to cesarean sections among such women. Changes in how dystocia is diagnosed and managed could reduce the cesarean section rate among these women by 50%.

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