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Effect of vaginal intercourse on spontaneous labor at term: a randomized controlled trial

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Abstract
Objective This study aimed at evaluating the effect of vaginal intercourse on spontaneous labor onset at term.
Methods In a randomized controlled trial, patients with singleton, cephalic, term, and low-risk pregnancy were assigned to either vaginal intercourse at least twice a week or abstinence. The following data were assessed: demographics, parity, vaginal coitus frequency before and during pregnancy, Bishop score at 38th weeks, gestational age at delivery, mode of delivery, and days between recruitment and delivery. The primary outcome was spontaneous labor onset.
Results Of the 123 patient analyzed, 63 were assigned to study group and 60 to control group. Mean interval between study recruitment and delivery was higher in sexually active women (15.05 days ± 0.8 compared with 14.17 days ± 0.8, $p = 0.45$) as well as the rate of cesarean delivery (14.3 % compared with 10 %, $p = 0.58$), but the differences were not statistically significant. The rate of spontaneous labor was similar in both groups (84.1 % in vaginal coitus group; 75 % in control group, $p = 0.26$).
Conclusion Our results showed that vaginal intercourse does not hasten spontaneous labor onset at term.

Keywords Spontaneous labour · Vaginal intercourse · Delivery · Randomized

ClinicalTrials.gov registration number NCT01907698.

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Introduction

In Europe, the prevalence of post-term pregnancy, defined as a pregnancy reaching 42 completed weeks [1], ranges from 0.8 to 8.1 % [2]. Such a wide variation can probably be the consequence of different protocols of labor induction and methods for assessing gestational age [3].

It is difficult to decide an "ideal" term above which a medical intervention (labor induction) brings more benefits than risks linked to the natural evolution of pregnancy. In addition, scientific evidence shows that the optimal management of pregnancies at 41 weeks and beyond remains a controversial issue [4].

Over the past decades, the incidence of labor induction has continued to rise, occurring in approximately 21 % of term pregnancies [5] and although with conflicting results, some studies suggest that it is associated with an increased risk of obstetric intervention, particularly cesarean delivery [6–8].

Sexual intercourse has been linked to the onset of labor and there are many biological reasons to justify it: oxytocin release during female orgasm [9] and nipple stimulation [10], mechanical stimulation of the cervix and uterus inferior segment [11] and the chemical effect of semen which contains prostaglandins E and F2α [12]. Hence, it is not surprising that some physicians and about 46 % of pregnant women believe it to be true [13].

Tomlinson demonstrated that 86 % of women and 93 % of men wanted to know if sexual intercourse influences the onset of labor and that knowing its impact would have an effect on their sexual activity at term [14]. Consequently, is important to find a scientific answer to this issue because if it is proven to be true, a decrease in the number of medical interventions for post-term pregnancy can occur.

Previous studies have conflicting results on this subject. A Cochrane review about the influence of sexual intercourse on cervical ripening and labor induction reported insufficient data to take any conclusions [15]. Further studies showed that sexual intercourse in late pregnancy was associated with earlier onset of labor and reduced requirement for labor induction at 41 weeks [16]. Other works demonstrated no increase in the rate of spontaneous labor [17] or any effect on hastening labor and cervical ripening [18].

Therefore, we propose to evaluate the effect of vaginal intercourse to hasten spontaneous labor onset at term and its impact in pregnancy duration, performing a randomized trial to clarify these questions.

Methods

We conducted a randomized, controlled, non-blinded trial at Santa Maria University Hospital in Lisbon, Department of Obstetrics, Gynecology, and Reproductive Medicine, from April 2009 to June 2011. The ethics committee of the institution approved the study protocol. The study was registered in ClinicalTrials.gov (registration number NCT01907698).

Patients were eligible if they were ≥18 years old, had a singleton term (≥37/0–7 weeks of pregnancy) and uneventful pregnancy (defined as being free of any chronic or gestational medical conditions, including any condition that would require activity restrictions or need to cesarean delivery), cephalic fetus presentation, intact membranes, irrelevant obstetric history and no previous cesarean delivery. Women were told that vaginal coitus at term is safe but its effect on labor onset is uncertain and that could possibly reduce the need for labor induction

Patients who agreed to participate in the study, after providing written informed consent, were randomly allocated to the vaginal intercourse group (vaginal intercourse at least twice a week) or to the control group (abstinence), according to a computer-generated randomization list.

A short questionnaire was conducted to provide some personal data, namely, patient age, marital status, vaginal coitus frequency before and during pregnancy.

At subsequent routine appointments women were asked whether they had fulfilled the study protocol.

All participants received standard obstetric care. Cervical examination was performed at each weekly routine visit and Bishop score was assigned at 38 weeks of pregnancy.

Labor was considered to be established when there were regular contractions and at least 3 cm of cervix dilation or when premature rupture of membranes at term occurred. Induction of labor was performed at the 41st week and the method was chosen according to the Bishop score—misoprostol (vaginal application of 25 ucg 6/6 h) if Bishop score <6 or oxytocin perfusion if ≥6.

For all patients enrolled into the study, the following data were recorded: demographic and reproductive characteristics, vaginal coitus frequency before and during pregnancy (before entering the study); Bishop score at 38 weeks of pregnancy; interval between recruitment and delivery, gestational age at delivery and mode of delivery. Collected data related to newborns included Apgar score at 1 and 5 min and birth weight.

After delivery information was obtained by clinical processes review. If delivery occurred in another hospital, data were obtained by telephone.

Our primary outcome was the rate of spontaneous labor onset in women with and without vaginal intercourse.

The sample size was calculated based on the following: in a previous study 6.9 % of sexually active women and 29.8 % of abstinent women did not have a spontaneous labor onset [16]. So to detect a difference of 22.9 % (29.8–6.9 %) in the rate of labor induction between groups, with an alpha of 0.05 and a statistical power of 80 %, 53 patients in each arm would be required.

All data management and analysis were performed using Graph Pad Prism® version 6.0. Analysis was performed by intention to treat. Student t test was used to compare continuous variables between groups and for categorical variables, χ^2 tests or Fisher exact tests, as appropriate.

All tests used two-sided results and $p < 0.05$ in any test was considered to be statistically significant. Relative risk and its 95 % confidence interval were calculated.

Results

During our recruitment period, 130 women were enrolled into the study. Two women in the sexually active group and one in the control group decided to withdraw from the trial. Two patients, one in each group, were excluded because they did not meet the study protocol and another two because clinical records were missing. This left 123 women for analysis: 63 in coitus arm and 60 in control arm (Fig. 1).

Patient demographic and labor characteristics are shown in Table 1. The differences between randomized groups were not statistically significant for any analyzed data.

The mean interval between study recruitment and delivery was higher in vaginal intercourse group compared with controls (15.5 ± 0.8 days vs. 14.17 ± 0.8, $p = 0.45$); nevertheless the difference was not significant.

The route of delivery was similar in both arms; although not statistically significant, the rate of cesarean delivery was also superior in sexually active patients (14.3 vs. 10 %, $p = 0.58$, Table 1).

Concerning the study primary outcome, of the 63 patients in vaginal coitus group, 53 (84.1 %) had a spontaneous labor

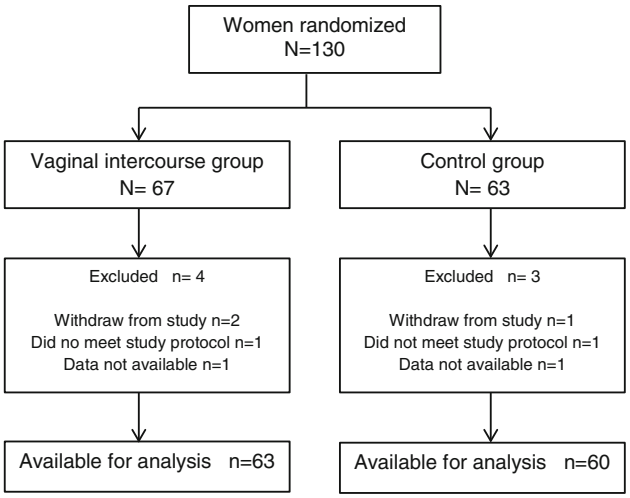

Fig. 1 Study flow chart

Table 1 Characteristics of women in the vaginal coitus and control groups

	Vaginal coitus group ($n = 63$)	Control group ($n = 60$)	p
Race[a]			
White	57 (90.5)	57 (95.0)	0.49
Other	6 (9.5)	3 (5.0)	
Maternal age[b] (years)	28.6 ± 0.65	28.9 ± 0.74	0.74
Marital status[a]			
Married	33 (52.4)	24 (40.0)	0.21
Single	30 (47.6)	36 (60.0)	
Parity[a]			
Nulliparous	42 (66.7)	39 (65.0)	0.85
Parous (≥1)	21 (33.3)	21 (35.0)	
Vaginal coitus frequency before pregnancy[b] (episode number per week)	3.67 ± 0.20	3.57 ± 0.21	0.73
Vaginal coitus frequency during pregnancy[b] (episode number per week)	2.1 ± 0.15	1.92 ± 0.17	0.53
Bishop score at 38 weeks[b]	2.59 ± 0.54	2.38 ± 0.23	0.54
Gestational age at delivery (weeks)[b]	40.0 ± 0.12	39.9 ± 0.11	0.84
Mode of delivery[a]			
Vaginally	54 (85.7)	54 (90.0)	0.58
Cesarean	9 (14.3)	6 (10.0)	

Data are expressed as n (% of n), mean ± standard deviation

[a] χ^2 test

[b] t test

onset, compared with 45 (45 of 60, 75 %) in control group, but the difference was not statistically significant (relative risk 1.1; 95 % CI 0.94–1.34, $p = 0.26$).

Concerning neonatal data, Apgar scores and mean birth weight (3,388 ± 41.3 g vs. 3,276 ± 50.4 g; $p = 0.09$) were similar in both groups.

Discussion

Our results did not fiund any significant evidence that vaginal intercourse at term promotes labor onset. Although it is a common belief that sexual activity can hasten labor, this suggested relationship, although biologically plausible, was not confirmed in this study.

The first randomized trial on this issue included only 28 patients, who were assigned to have vaginal intercourse or to be abstinent. The authors verified that the role of sexual intercourse as method of labor induction was uncertain [19]. In 2006, Tan showed in a prospective study based on a coital activity diary of pregnant women from 36 weeks of gestation until delivery that coitus was associated with a reduction in post term pregnancy and requirement for labor induction [16]. Nevertheless, scientific evidence is mainly in accordance with our conclusions. Tan conducted another work, where pregnant women at term were randomly selected and advised coitus (patients were encouraged to have sex) or control group, whose results contradicted their previous findings. Among patients advised to have intercourse, the rate of spontaneous labor onset was not superior [17].

In 2009, the same investigators concluded that women who reported coitus were less likely to go into spontaneous labor [20] and recently Omar showed that suggesting coitus during late pregnancy is not effective in achieving an earlier onset of labor or in reducing the rate of labor induction [21].

We also found that in sexually active patients gestational length (40 ± 0.12 vs. 39.9 ± 0.11, $p = 0.84$) tends to be superior, as well as the mean interval between recruitment and delivery (15.5 ± 0.8 days vs. 14.17 ± 0.8, $p = 0.45$); nevertheless when compared to abstinent women, these outcome differences were not clinically significant. Earlier studies demonstrated that delivery in sexually active women at term occurred later than those who were not [18, 21] and that gestational age at delivery and the intervention to delivery interval did not differ across advice-coitus versus control trial arms [21]. It appears that sexual intercourse does not hasten labor and may even delay its onset. We postulate that women available to maintain vaginal coitus at least twice a week were in a state of relative comfort and this could be a marker for a late delivery.

The cutoff of vaginal intercourse at least twice a week we chose to use was based on a previous study concerning

sexual behavior during pregnancy in the Portuguese population. In this study 32.4 % of couples had sex once a week, 25.8 % two to three times a week and 6.6 % four to seven times a week [22].

Regarding our results, Bishop score at 38 weeks of gestation seems to be independent of sexual activity. However, we did not evaluate the correlation between the frequency of vaginal intercourse and Bishop Score. Other authors had assessed it and reported that the number of episodes of coitus had no influence on cervical status [18].

We also did not fiund any significant difference between the mode of delivery in the two groups, although the rate of cesarean delivery was superior in coitus group (14.3 vs. 10 %, $p = 0.58$). This was in accordance with the results of previous studies [17, 18].

Specific changes that occur in each pregnancy trimester have significant influences on sexual behavior. Reduction in sexual activity tends to occur as pregnancy progresses, particularly during the third trimester and both the women and their partners have concerns regarding complications in the pregnancy as a result of sexual intercourse [23]. In the Portuguese population, sexual activity decreases 55 % during the third trimester. A significant number of couples reported fear of sexual intercourse mainly because they fear "harming the baby" [22]. Previous studies have already shown that vaginal coitus in term, non-complicated pregnancy, is safe [10] and that coitus and orgasm were not associated with adverse pregnancy outcomes [20].

In our study there was no significant difference in the Apgar score at 5 min or birth weight, and although it was not part of our investigation there was also no difference across the trial arms concerning neonatal and maternal morbidity.

There are some limitations in the study we have conducted. We did not record the presence of male partner in the appointments and although we tried to see the couple together, women were frequently counseled alone and this lack of enrollment of the male partner could have had an effect on intercourse rate. Moreover, there was no way to assess if couples were being honest concerning the frequency of sexual activity. People are not used to talk about their sexual lives and this became obvious when women came to our appointments and became hesitant when questioned if they had fulfilled the study protocol. We also did not evaluate other variables that might influence oxytocin release and consequently uterine contractions, like orgasm and nipple stimulation frequency.

In fact, if sexual activity at term really expedites the onset of labor a reduced number of medical interventions for post-term pregnancy would be necessary. Nevertheless, according to our data, we should not let patients believe that coitus at term decreases the number of labor inductions, gestational length or the incidence of post term pregnancy.

Conflict of interest The authors declare that they have no conflict of interest.

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