

The effect of hyoscine N– butyl bromide on the duration of active phase of labor

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Abstract

Background and objective: Hyoscine N-butyl bromide acts by inhibiting cholinergic transmission in pelvic parasympathetic ganglia and antagonizing muscarinic receptors of smooth muscles in the abdomen and pelvic organs, thus relieving spasm aiding to cervical dilation. This study is to assess the efficacy of Hyoscine butyl bromide on cervical dilation in multigravid pregnant women during the active phase of labor.

Methods: A randomized clinical prospective trial was conducted in maternity hospital in Sulaimaniyah, from 1st of January to the 1st of July 2010. Women were consecutively randomized into: the study group (A) who received 40 mg Hyoscine N-butyl bromide by slow intravenous injection in the active phase of first stage of labor and the control group (B) who received 2ml of normal saline. Each group consists of 130 patients after excluding high risk pregnancy.

Results: Mean duration of active phase of labor was 142.69 min, 258.00 min in group A and B, respectively (p-value < 0 .001). Mode of delivery and neonatal outcome were comparable. No adverse maternal or fetal effects were noted.

Conclusion: Intravenous Hyoscine N-Butyl Bromide shortens the duration of active phase of labor without any unwanted fetal or maternal effects, also it effectively shortens the 2nd and 3rd stages of labor.

Keywords: First stage, labor, Hyoscine N-butyl bromide, cervical dilatation

Introduction

Labor is not always following an ideal course, sometime it becomes prolonged which is likely to give rise to 3 types of distress, namely: maternal, fetal and obstetrician's distress¹. Hyoscine N-butyl bromide is a quaternary alkaloid which is derivative of the Dubosia tree found mainly in Australia that is a competitive antagonist of acetylcholine at muscarinic receptors^{2,3}. The drug has a selective blocking action on the intramural parasympathetic ganglia especially the cervico-uterine plexus and thus aiding analgesia and cervical dilatation while uterine contractions are not affected⁴. Active management of labor is described as a policy to reduce the rate of prolonged labor; methods that aim to minimize the incidence of functional cervical dystocia and shorten the 1st stage of labor are

welcomed by the obstetricians and the patients^{3,5}.

Methods

This randomized prospective clinical trial was conducted in Maternity Teaching Hospital in Sulaimaniyah from 1st of January to 1st of July 2010. All women included were informed of the nature and scope of the study and verbal consents were obtained. Two hundred and sixty multigravid women were selected according to equation of the sample size determination of the PASS¹² (power analysis & sample size) software from NCCS (national content standards for social studies) company. The patients are divided into 2 groups:

Group A: consisted of 130 women, received 2ml (40 mg) Hyoscine butyl N- bromide.

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Group B: consisted of 130 women, received 2 ml normal saline.

Both groups injected on admission to labor ward in the active phase of 1st stage of labor with cervical dilatation of 4 cm. Inclusion criteria were multi gravid (Para 1-4), term pregnancy (completed 37 - 42) weeks, viable singleton pregnancy, vertex presentation, spontaneously established labor. all women who did not fit the above criteria, were excluded from this study. Clinical history includes age, parity and gestational age. The later was calculated on the basis of either last menstrual period (LMP) confirmed by early ultrasound or by early ultrasound when LMP was unknown. General physical and obstetrical examinations along with fetal heart rate monitoring by Sonicaid every 15 minutes, pre- and post- drug administration were evaluated. Labor was monitored clinically and by partograph. After 1 hr, every woman was assessed for evaluation of blood pressure, pulse rate, fetal heart rate (FHR) and was asked about dry mouth, vomiting, blurring

of vision and headache. The outcome measures were evaluated including active phase duration by measuring time interval from drug administration till delivery, mode of delivery, if cesarean sections (C/S) were performed; their indications were verified along with maternal side effects. Neonatal outcome was assessed by 1st and 5th minute Apgar score. The data were collected, tabulated and analyzed using the statistical program SPSS (statistical package for social sciences) version 20, using t-test, chi-square and Fisher exact test. P-value when less than or equal to 0.05 was taken as significant.

Results

Table 1 shows demographic characteristics of the studied groups. A total of 260 patients were included in this study which shows different variables including: age, parity and gestational age of both groups. No statistical difference was found between both groups.

Table 1: Demographic characteristics of the studied groups

Demographic distribution	Criteria	Group A	Group B	P-value
Age (years)	<20	3 (2.3%)	1 (0.8%)	
	20-24	29 (22.3%)	29 (22.3%)	
	25-29	49 (37.7%)	47 (36.1%)	
	≥30	49 (37.7%)	53 (40.8%)	
Mean± SD		27.62±4.179	27.62±3.771	0.75
Parity	P1	48 (36.9%)	67 (51.5%)	
	P2	55 (42.3%)	38 (29.2%)	
	P3	20 (15.4%)	20 (15.4%)	
	P4	7 (5.4%)	5 (3.9%)	
Mean ± SD		1.89±0.856	1.72±0.865	0.099
Gestational age In weeks	37 +6D	1 (0.8%)	00	
	38 +6D	65 (50.0%)	82 (63.1%)	
	39 +6D	50 (38.5%)	40 (30.8%)	
	40 +6D	14 (10.7%)	8 (6.1%)	
Mean± SD		38.59±0.690	38.42±0.609	0.126
Total		130 (100%)	130 (100%)	

The mean duration of active phase of labor in group A and group B, were (142.69 ± 44.30) minutes and (258.00 ± 23.223) minutes respectively. The difference between the two groups was statistically

highly significant (p value <0.001). The difference in the total number is due to exclusion of cases ended by cesarean section for fetal indications.

Table 2: Duration of the active phase of labor in the two groups

Time in minutes	Group A		Group B	
	Frequency	Percent	Frequency	Percent
Active. phase				
< 240	120	92.3	0	0
240-279	3	2.3	60	46.2
280-319	3	2.3	47	36.2
More than 319	3	2.3	21	16.1
Total	129	99.23	128	98.46
Mean ± SD	142.69±44.30		258.00±23.223	
p-value	< 0.001			

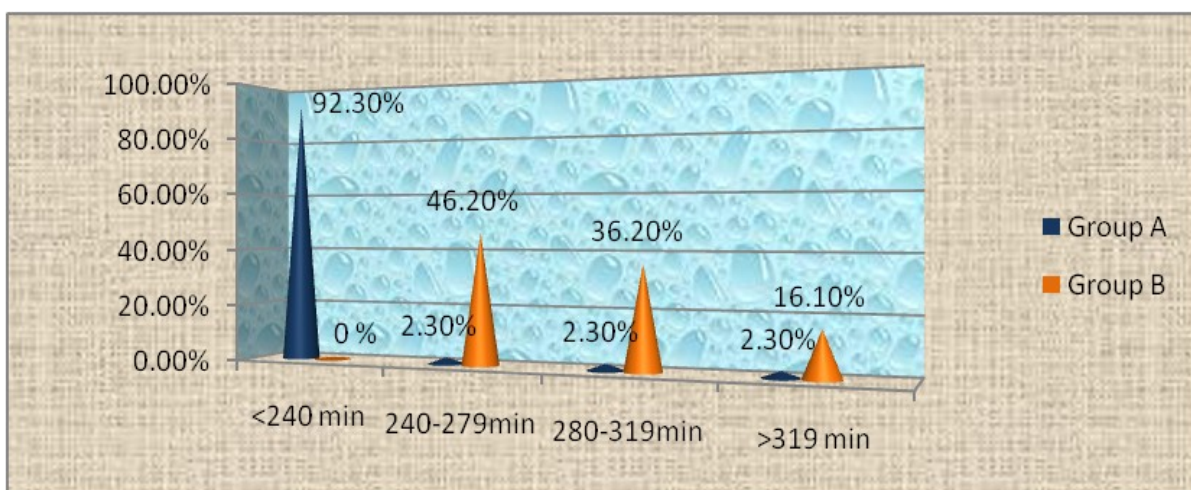


Figure 1: Duration of the active phase of labor

Table 3 shows the duration of 2nd stage of labor in both groups. The mean duration of 2nd stage of labor in group A were (15.07± 3.063) minutes while in group B were (18.38±3.153) minutes. The difference between group A and group B was statistically highly significant (p- value = 0.011), the difference in the total number is due to exclusion of cases that ended by cesarean section and instrumental deliveries. Table 4 shows the duration of the third stage of labor in both groups, the mean ± SD duration of third stage in group

A Was (7.54±399) minutes while in group B was (12.35 ± 1.803) minutes. The difference between 2 groups was statistically significant, P-value < 0.001. Table 5 shows that APGAR score at the 1st minute for group A, B respectively were (8.18±0.590) and (8.06 ± 0.603) while APGAR score at 5th minute for group A, B were (9.58±0.882) and (9.47±1.576) respectively. The p-value for APGAR1 was 0 .982 and for APGAR 5 was 0.602 and the difference between both groups was statistically not significant.

Table 3: Duration of 2nd stage of labor

Time in minutes	Group A		Group B	
	Frequency	Percent	Frequency	Percent
Second stage				
10-14	18	13.8	10	7.7
15-19	78	60.0	61	46.9
20-24	31	23.8	51	39.2
More than 24	1	0.8	4	3.0
Total	128	98.5	126	96.9
Mean ± SD	15.07±3.063		18.38±3.153	
p-value	0.011			

Table 4: Duration of third stage of labor

Time in minutes	GROUP A		GROUP B	
	Frequency	Percent	Frequency	Percent
third stage				
5-9	105	80.8	18	13.8
10-14	22	16.9	107	82.3
More than 14	1	0.8	1	0.8
Total	128	98.5	126	96.9
Mean ±S.D	7.54±2.399		12.35±1.803	
p-value	< 0 .001			

Table 5: Apgar score at first and fifth minutes

Mean ±SD	Group A	Group B	P-value
Apgar 1 st minute	8.18±0.590	8.06±0.603	0.982
Apgar 5 th minute	9.58±0.882	9.47±1.576	0.602

Table 6: Post Partum Hemorrhage in both groups

PPH	Group A		Group B	
	Frequency	Percent	Frequency	Percent
Absent	129	99.2%	127	97.7%
present	1	0.8%	3	2.3%
Total	130	100.0%	130	100.0%
P- value	0.622			

Table 7: Mode of Delivery

Mode of delivery	Group A		Group B	
	Frequency	Percent	Frequency	Percent
NVD	128	98.4%	126	97.0 %
LSCS	1	0.8%	2	1.5%
Instrumental	1	0.8%	2	1.5%
Total	130	100%	130	100%
P value	0.574			

There was only one case in group A that had PPH due to uterine inertia while three cases reported in group B (0.8% and 2.3%) respectively. There was no statistical significance between both group p-value was 0.622.

There was only one case (0.8%) of instrumental delivery (vacuum extraction) in group (A) while two cases (1.5%) in group B; these were due to delay of 2nd stage of labor and fetal distress. In group A, there was one case (0.8%) delivered by CS because of fetal distress and meconium and there were two cases in group B (1.5%) due to meconium. This was statistically not significant (p-value = 0.574). Table 8 shows mean FHR in both groups.

In group A, pre and post drug administration were assessed by a Sonicaid every 15 min. There was no significant change in the FHR in both groups as p-values were (0.902 and 0.224) which was statistically not significant. Regarding the side effects of Hyoscine N- butyl bromide compared to placebo, maternal tachycardia was recorded in 8 cases (6.2%), 6 cases (4.6%) in group A and group B respectively. Four cases (3.1%) of fetal tachycardia were recorded in both groups, while dryness of mouth was recorded in 6 cases (4.6%), 3 cases (2.3%) in group A and group B respectively. All side effects were not serious and did not require treatment and there were no cases of vomiting or blurring

Table 8: Mean FHR pre and post drug administration.

FHR	MEAN ± SD	GROUP A	GROUP B	P-VALUE
PRE -drug		137.88±6.557	137.77±7.527	0.902
POST-drug		139.18±7.632	138.02 ±7.718	0.224

of vision. Thus non significant association was observed between both groups, p-value = 0.897.

Discussion

Hyoscine N- butyl bromide has been in usage for more than half a century in varying doses (20mg, 30mg, 40mg) and varying routes (intramuscular, intravenous, rectal, oral). Corson et al, studied the various uses and mode of action of HBB in obstetrics and gynecology, and found that the most prompt action occurred with intravenous and suppository routes and the optimal time for administration was at 4 cm cervical dilatation, as no significant side effects were observed with up to 40mg dose⁶. Parity has an important influence on the duration of labor. Most of the studies included only primigravidae. In the present study multigravidae (p1-p4) are included which is only comparable with the study of Samal et al (1998) which included p1-p3⁷. The initial cervical dilatation at which the drug was given was 4cm in both groups of this study. That goes with most of the studies done before, such as the studies conducted by Kaur Devinder et al. (2003) or Muralidhar V Pai et al.(2003)⁸. A study done by Battacharya et al.(1985)^{9,10} about the effect of 20 mg HBB intramuscularly on 100 primigravidae, found the mean labor time was shortened by 3 hours and 40 minutes and 81% delivered within 8 hours. Kamalesh et al. (2003)¹¹ were the first who used a dose of 40 mg intravenously, but in two divided doses, 20 minutes apart. He found that labor was shortened by 5 hours and 12 minutes compared with control group. Another study from Jamaica done by Shobha et al (2006), also showed shortening of the first stage of labor by 32% when they used 40 mg intravenously¹². These results are near to what we reported in this study that we found higher proportion of women had short duration of active phase in HBB group. The mean duration of 2nd stage of labor in this study was less in the HBB group than the control group. This result is comparable to the study done by

Kamalesh Tiwaries et al. (2003) showing significant shortening of duration of 2nd stage in HBB group which was about 22.83 minutes¹¹. Regarding the duration of 3rd stage of labor in the present study, the mean time was shorter in HBB group. This result is near to the study done by Singh KC et al. (2004) which showed that the mean time of 3rd stage of labor was about 9.33minutes¹³. C/S and assisted vaginal delivery rates in this study were comparable to the result found by Shobha et al (2006) which showed the rate of spontaneous vaginal delivery was 84% with only one case of C/S and about 15% of assisted vaginal delivery¹². There were no statically significant serious side effects of HBB in this study; such a result is near to the study done by Bhattacharya et al. (1984) which had about 15 cases of transient maternal tachycardia and 5 cases of dryness of mouth¹⁴. Another study done by Poornima R. et al (2002) found about 5 cases of transient maternal tachycardia and 3 cases of vomiting and 2 case of dryness of mouth and this was in agreement with this study¹⁵. In this study FHR was assessed by Sonicaid every 15 minutes. There were no significant changes observed in the FHR before and after HBB injection. This result agrees with the study done in Jamaica by Mishra SL et al (2007), that study showed no significant changes in the FHR, which is also assessed by Sonicaid, before and after the drug¹⁴. In a study done by Singh KC et al. (2004) fetal well-being was evaluated intermittently by CTG, FHR being specifically recorded at baseline and after 30 minutes, they found that all CTG intermittently preformed were normal without any sign of fetal distress and FHR was within normal range (126-148 bpm) in all participants¹⁶. In the present study, Apgar score was assessed at 1st and 5th minutes. The study which was near to our result, was done by Samal et al (2007) who reported 9.0 ± 0.6 (7-10), 9.8 ± 0.4 (9-10). These results indicate that HBB does not adversely affect the neonatal outcome. This is also in agreement with the study

of Kamalesh Tiwari et al (2003), which concluded that HBB did not interfere with uteroplacental circulation¹².

Conclusion

This study shows that intravenous HBB is effective and significantly improves the rate of cervical dilatation, effectively shorten 2nd and 3rd stages of labor without any unwanted fetal and maternal side effects.

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