

Carbetocin versus oxytocin at caesarean section: a service evaluation and potential dosing strategy.

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Introduction

Carbetocin is a long-acting oxytocin analogue recommended to be given to prevent postpartum haemorrhage (PPH) at caesarean section (CS). The dosing regimen advised for carbetocin is to bolus up to 100mcg, but the effective dose required to treat 90% of low-risk non-labouring patients (ED90) is as low as 14.8mcg[1]. We introduced carbetocin as 1st line in our units for all CS unless contraindicated and subsequently performed a retrospective analysis to assess its efficacy.

Methods

After approval by our trust service evaluation panel, an audit form was introduced with carbetocin for contemporaneous completion by the attending anaesthetist. Data collected was compared with a previous retrospective audit of 100 patients undergoing CS who received oxytocin as 1st line. Patients from both groups were matched for category of CS. Estimated blood loss (EBL), requirement for 2nd line uterotonics and length of stay (LOS) on labour ward were compared.

Results

Data was collected for 201 patients undergoing CS. 198 women received carbetocin; 24% (48) were in active labour prior to CS, 76% (150) were not. There were no significant side effects in 74% (146) of patients; for those who experienced side effects there was no correlation with dose.

Carbetocin versus Oxytocin: In the carbetocin group we demonstrated significantly reduced mean EBL (mls) (496 vs 599, $p < 0.01$) and reduced usage of 2nd line uterotonics (15 vs 28, $p < 0.025$) compared with oxytocin. Additionally, LOS for patients who received carbetocin was also significantly less than oxytocin (5.9 vs 8.8 hours, $p < 0.007$).

Results

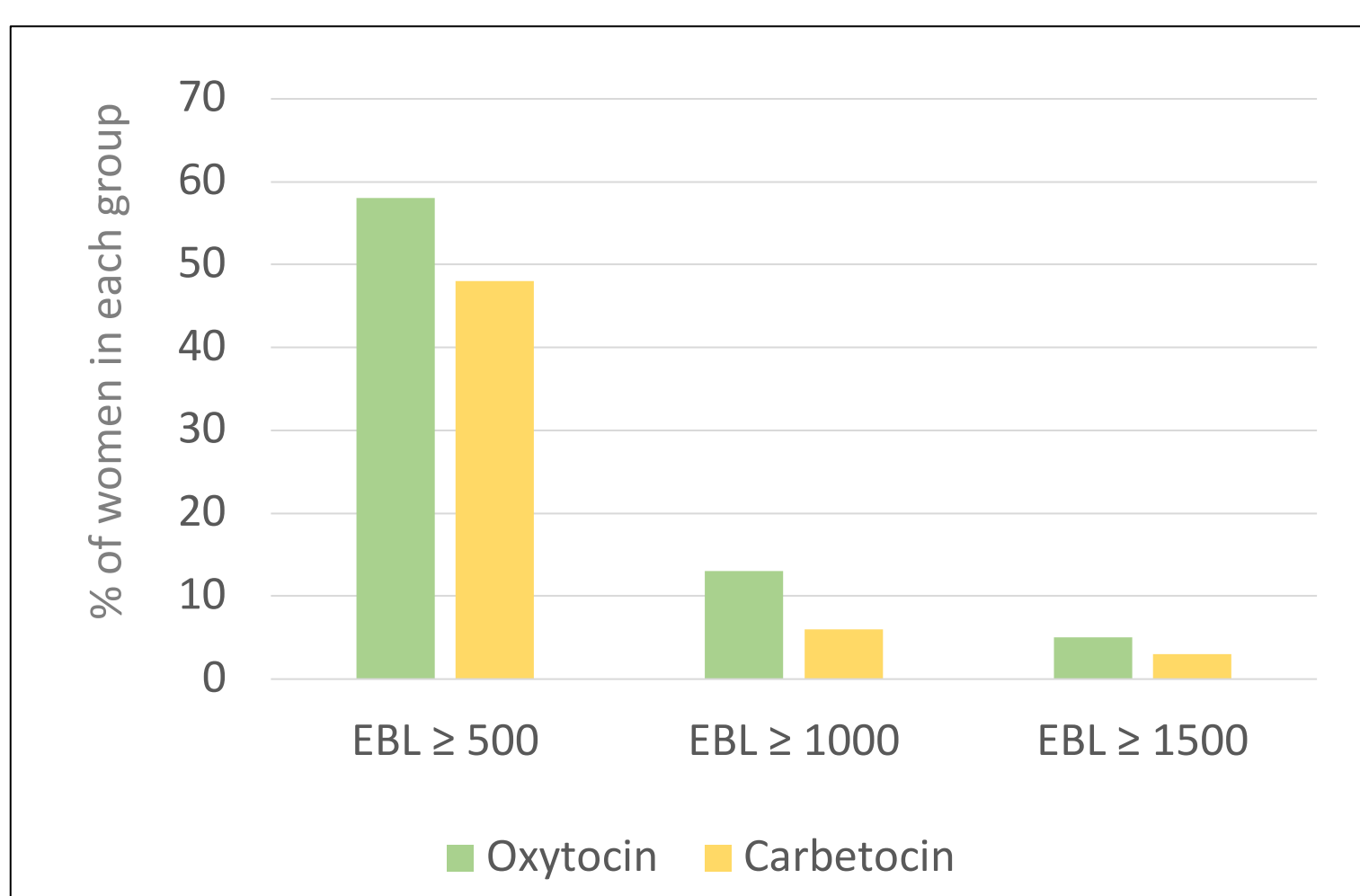


Figure 1. Comparing Oxytocin vs Carbetocin groups' estimated blood loss (EBL) (mls) for women who underwent Category 1-4 caesarian sections.

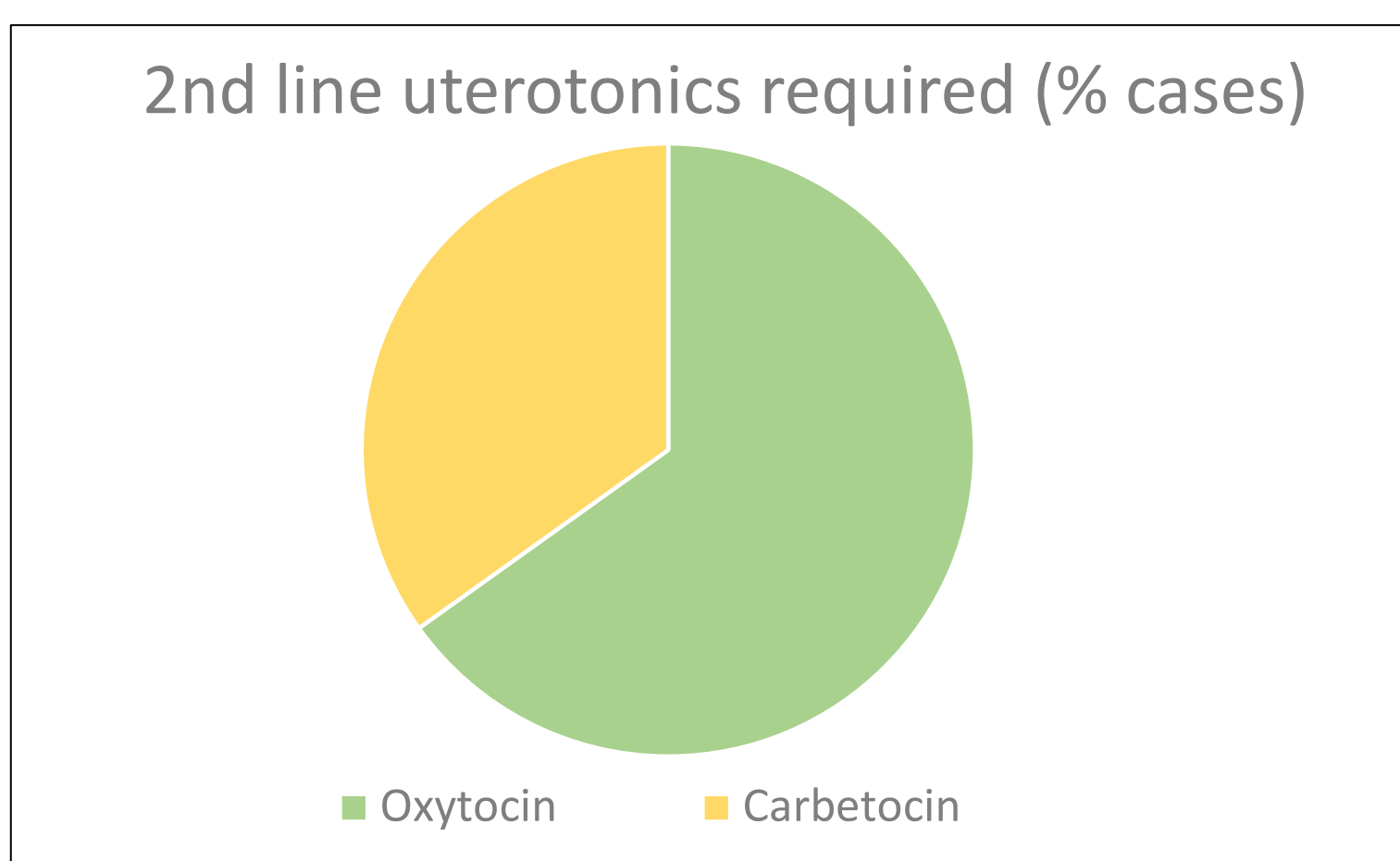


Figure 2. % of cases who required 2nd line uterotonics following initial 1st line treatment; Oxytocin vs Carbetocin bolus ($p = 0.025$)

Carbetocin Dosing: Comparing the mean doses of carbetocin given (mcg) to achieve good uterine tone, this varied significantly from non-labouring vs labouring vs augmented labour patients (84 vs 88 vs 91, $p < 0.05$).

	Labour, augmented (n=17)	Labour, not augmented (n=31)	Not in labour (n=150)	P value
Mean dose of carbetocin (mcg)	91	88	84	<0.05
Mean EBL (mls)	644	555	528	<0.01
Mean uterine tone (x/5)	4	4.2	4.5	>0.05

Table 1. Table to show variation in mean carbetocin dose given, EBL and uterine tone (scored out of 5; where 5 is excellent and 1 is poor), depending on whether patient is in labour, augmented with oxytocin infusion or not in labour.

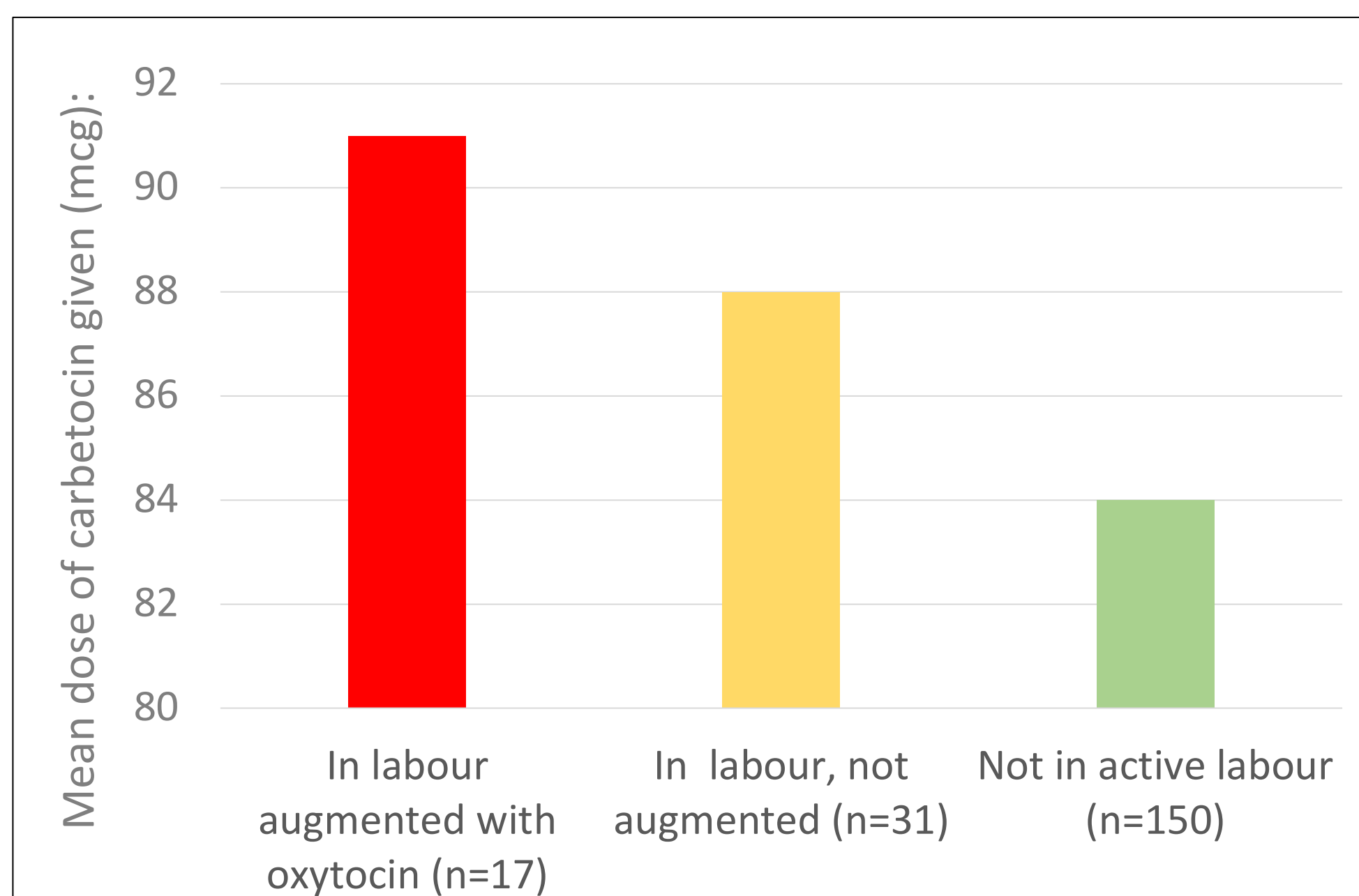


Figure 3. Variation in mean dose of carbetocin given depending on whether patient is in labour, augmented with oxytocin, or not.

Discussion

Our experience of introducing carbetocin reflects the published evidence for efficacy, reduced incidence of PPH and reduced use of additional uterotonic agents compared with oxytocin[2]. Despite slightly lower doses of carbetocin being given to non-labouring patients we found the mean administered doses were close to the maximum, and often notably higher than the ED90. Considering this, we propose a visual decision aid to help clinicians stratify patients into low, moderate or high risk of PPH and select an appropriate suggested carbetocin dose accordingly. This would highlight early those who are high risk of PPH and aim to further reduce the incidence of side effects and improve patient experience in low-risk patients.

Figure 4. Example of visual decision aid to help stratify patients into low, moderate or high risk of PPH based on their risk factors and subsequent suggested dosing strategy. This would be a guideline only and subject to change depending on clinical picture intra-operatively.

What dose of carbetocin should you use? what are the risk factors for PPH?			
Low risk: Primip Elective CS None these risk factors..			
Medium risk: Polyhydramnios Multiple previous CS overall Raised BMI/macrosomia PET – controlled Multiple gestation Previous PPH Fibroids			
High risk: Multiple medium risk factors clinical suspicion Sepsis Prolonged labour (>24hrs) Augmented labour (≥ 2hrs oxytocin) Abnormal placentation Coagulopathy			
PPH risk	Low	Medium	High
Not in labour	20-40mcg	50-70mcg	100mcg
Labour	50-70mcg	100mcg	100mcg
Caveats: - Examples of risk factors for PPH (non-exhaustive list) - Check in with surgeon for adequacy of tone - Can always give more than your initial plan - Current max licensed dose is 100mcg (1 ampoule).			
Suggested rate of administration on 20mcgs (2mls) per minute			

References

- [1] Heesen M, Carvalho B, Carvalho JCA et al. International consensus statement on the use of uterotonic agents during caesarean section *Anaesthesia* 2019, 74, 1305–1319
- [2] Voon HY, Suharjono HN, Shafie AA et al. Carbetocin versus oxytocin for the prevention of postpartum hemorrhage: A meta-analysis of randomized controlled trials in caesarean deliveries. *Taiwanese Journal of Obstetrics and Gynecology* 2018; 57: 332–9.