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Systematic Review

Vaginal birth after previous two or more caesarean sections: a systematic review

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ABSTRACT

Vaginal birth after caesarean section (VBAC) is an appropriate solution to decrease the caesarean section rates and also to minimise the morbidities and complications due to repeat caesarean sections. Though trial for vaginal birth, that too after two or more caesarean sections is challenging, it will certainly help in reducing caesarean rates worldwide if tackled by proper decision making and vigilant observation. Present study is intended to review the research publications surrounding VBAC-2. Search was carried out for gathering research publications up to April 2024 by using the keywords of "Vaginal birth after two or more caesarean sections", "trial of labour after two or more caesarean section", "VBAC-2", or "TOLAC-2". 51 relevant publications were considered in present study. Success rates of VBAC-2 studies were calculated as 70.83% for the study population. Furthermore, uterine rupture, blood transfusion, hysterectomy, maternal and neonatal outcomes were analysed after VBAC-2. Besides these, 14 case studies were analysed separately. Results indicate that VBAC-2 is safe, but careful patient selection and vigilant monitoring of indications is necessary for decision making. Information gathered and analysed will help in making evidence centred decisions in such cases.

Keywords: Vaginal birth, Two or more caesarean, VBAC-2, TOLAC-2, Review

INTRODUCTION

Caesarean section is many times a critical life saving procedure for mother as well as baby. It is certainly needed where vaginal deliveries would pose risks. But it comes with possible risk of unfavourable maternal health complications. Hence, it is not advised to perform the caesarean section without justified medical indications.[1]

The recent upsurge of caesarean section rates throughout the world has become cause of concern for public health authorities. Though this practise is common, it poses an excessive maternal morbidity and mortality.[2] The obstetrician's awareness of the need to reduce caesarean section rates is being increased; but the reasonable fear of uterine rupture has an effect on the choice of delivery route, specifically in the case of a patient with prior two or more previous caesarean sections. Hence, the trial of labour is not often offered.[3] The overall caesarean section rate in India increased from 2.9% during 1992-93 to 21.5% during 2019-21.[4,5]

In comparison to caesarean section, vaginal delivery is associated with less maternal and perinatal consequences, requires limited anaesthesia, has less risk for postpartum morbidity with a shorter hospital stay and ensures earlier bonding between mother and baby.[6,7] VBAC has been mostly studied in the patients with one prior caesarean delivery, debate persists about the risks and benefits of VBAC for women with two or more prior caesarean deliveries. Consenting a trial of labour in women who have had a one prior low transverse caesarean section has become gradually accepted and is being widespread throughout the world. Studies with regard to the safety of trial of labour in women with two or more prior caesarean sections are meagre.[8]

However, Hounkponou et al breaking the dogma suggested that history of two or more caesarean sections is not an absolute indication of caesarean section; advising the possibility of delivery by natural ways.[9] It has been suggested in several reports that women who have had more than one prior caesarean delivery may safely undergo a trial of labour.[2]

The choice of VBAC may appear a sensible and rational judgement for many women, if these women are selected correctly. The risk of such morbidities as infection, surgical injuries, postpartum haemorrhage, thromboembolism, hysterectomy and even mortality will decrease.[10]

There are no studies on the topic "vaginal birth after previous two or more caesarean sections" from India except one case report by, Wakode and Sharma, Vishwakarma et al, has done prospective study under the title vaginal delivery after one or more caesarean, but separate data for VBAC 1 and VBAC 2 is not provided.[11,12] This prompted us to undertake present study.

METHODS

For present review, the publications available online and in print form are considered. The search was targeted to locate research publications published in English language, which were focused on vaginal birth after previous two or more caesarean deliveries. The title of paper or key words of paper, if including vaginal birth or trial of labour after two or more caesarean sections were considered.

The search key terms were as follows, ("Vaginal Birth after two caesarean sections" or "VBAC-2" or "trial of labour after two caesarean sections" or "TOLAC-2" or "VBAC after two caesarean sections" or "vaginal birth after multiple c sections labour").

Inclusion criteria

Papers published in English including the theme like vaginal birth after two or more caesarean sections or trial of the labour after two or more previous caesarean sections.

Exclusion criteria

Papers which are not in English language, papers which have mention of vaginal birth after one or two caesarean sections, but not specifying VBAC 2 and VBAC 1 separately.

RESULTS

Total 51 research papers on VBAC-2 are considered for the present review. Further they are categorised in following categories such as, prospective studies; retrospective studies; review articles and case studies.

Among these, fifty-one research papers included, five were prospective studies (three-prospective cohort, one was prospective cross sectional and 1-prospective study, Table 1.

The twenty-eight research papers were retrospective studies (retrospective cohort-10, retrospective cross sectional-two and retrospective-sixteen (Table 2).

The number of patients varied considerably, ranging from twenty-six to nine hundred and seventy-five in prospective studies and ten to 1228 in retrospective studies.

The details such as, success rate, percentage of uterine rupture, transfusion and hysterectomy and number of emergencies LSCS performed are given in Table 1 and 2.

Besides these four review articles and fourteen-case studies are included.

Review articles on VBAC-2

Four review articles on VBAC-2 are included in present study, such as Tahseen and Griffiths is based on seventeen published papers; Mao and Shen are based on thirteen papers; Fruscalzo et al based on 18 papers and Whale and Woods, on 3 research publications.[8,13-15]

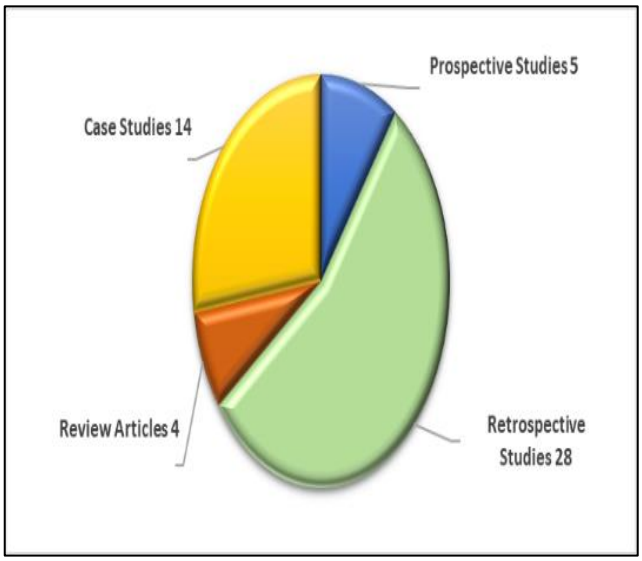

Figure 1: VBAC-2: categorisation of research publications, (n=51).

DISCUSSION

Present systematic review shows that trial of vaginal birth after two or more caesarean sections is based on total 8608 study population, among these, 1810 is study population of prospective studies, 6798 of retrospective studies and 22 of case studies.

Table 1: Prospective studies on VBAC-2.

Reference	Study design and (Duration)	Study population	No. of emergency LSCS	Uterine rupture	Trans-fusion	Hysterectomy	Success rate	Maternal outcome	Neonatal outcome
Hounkponou et al[9]	Prospective cross sectional (2016)	162	58	0	0	0	53.70%	No morbidity	No morbidity
Maroyi et al[16]	Prospective cohort (2015-2020)	532	137	0.4%	0	0	76.1%	0.4%	6.9% morbidity
Granovsky et al[17]	Prospective (1994)	26	7	0	-	0	73%	No morbidity	No morbidity
Chattopadhyay et al[21]	Prospective cohort (1986-1992)	115	12	0.8%	0	0.8%	90%	Morbidity 1.6%	Pre-natal deaths 2.6%
Landon et al[24]	Prospective cohort (1999-2002)	975	-	0.9%	3.2%	0.6%	66%	Morbidity 3.8%	NND 0.15%

Table 2: Retrospective studies on VBAC-2.

Reference	Study design and (Duration)	Study population	No. of emergency LSCS	Uterine rupture	Trans-fusion	Hysterectomy	Success rate	Maternal outcome	Neonatal outcome
Phelan et al[2]	Retrospective (1982-1986)	501	155	1.8%	0	0.2%	69%	1.8%	-
Roux et al[3]	Retrospective cohort (2013-2020)	52	17	1.9%	0	0	67.3%	2.2%	0
Emembolu[18]	Retrospective (1998)	139	14	1.4%	35%	0	33%	18%	PND 12%
Jamelle[19]	Retrospective (1996)	10	0	10%	0	0	90%	10%	0%
Vigorito et al[20]	Retrospective (2016)	10	1	0	0	0	90%	0	0
Mesleh et al[22]	Retrospective (1994-1999)	255	0	0.3%	NS	0	60%	2.55%	NS
Macones et al[25]	Retrospective cohort (1996-2000)	1082	0	1.8%	0.92%	0	74.6%	1.17%	1.34%
Rotem et al[26]	Retrospective cohort (2005-2009)	485	73	0.6%	1.6%	0.2%	86.2%	0.6%	0
Bretelle et al[27]	Retrospective (1990-1995)	96	33	3%	-	1%	65.6%	3.2% morbidity	NS
Spaans et al[28]	Retrospective cohort (1988-1997)	59	10	3%	6.7%	1.7%	83%	1.7%	0
Pruett et al[29]	Retrospective (1988)	55	30	3.2%	0	3.63%	64%	19%	0
Farmakides et al[30]	Retrospective (1987)	57	13	0.56%	-	0	77%	0.6%	-
Dombrowski et al[32]	Retrospective cohort (2010-2012)	1228	744	0	-	0	39.4%	2% morbidity	1.07%
Miller and Grobman[33]	Retrospective cohort (1999-2002)	152	53	1.8%	0	0	65%	2%	2.2%
Asakura and Myers[34]	Retrospective (1987-1991)	302	0	0	0	0	64%	2.1% morbidity	-

Continued.

Reference	Study design and (Duration)	Study population	No. of emergency LSCS	Uterine rupture	Trans-fusion	Hysterectomy	Success rate	Maternal outcome	Neonatal outcome
Garg and Ekuma-Nkama[35]	Retrospective (1997-2002)	134	68	1%	5.7%	0	49%	4.5% complications	NNU 1.34%
Modzelewski et al[36]	Retrospective cohort (2010- 2017)	35	13	0	4.5%	0	62.85%	13.6%	0
Davidson et al[37]	Retrospective cohort (2020)	73	19	0	NS	0	74.0%	22%	-
Breslin et al[38]	Retrospective (1999-2002)	821	-	0	-	0	62	9.86% morbidity	10.5% morbidity
Wagner et al[39]	Retrospective cross sectional (2014-2018)	485	-	-	-	-	86%	9.5%	12.4%
Cahill et al[40]	Retrospective Cohort (1996-2000)	89	19	0	2.2%	0	79.8%	-	-
De Leo et al[41]	Retrospective (2011-2019)	114	27	0	-	0	76.1%	0%	-
Hansell et al[42]	Retrospective (1983-1987)	35	8	0%	2.8%	0%	77%	0%	0%
Lei et al[43]	Retrospective cross sectional (2021)	21	1	0	4.8%	0	81%	0%	4.8% complication
Metz et al[44]	Retrospective (2015)	369	126	-	-	-	66%	-	-
Novas et al[45]	Retrospective (1986-1987)	36	8	2.7%	0	0	80%	-	-
Porreco and Meier[46]	Retrospective (1983)	21	7	0	0	0	66%	-	-

Table 3: Case studies on VBAC-2.

References	Study population
Ogah et al[6]	3
Shams and Oligbo[7]	1
Wakode and Sharma[11]	1
Indirayani et al[23]	3
Arslan et al[47]	1
Bowyer and Chapman[48]	1
Butt et al[49]	3
Fruscalzo et al[50]	2
Lawson[51]	1
Nkwabong et al[52]	1
Onafowokan et al[53]	2
Skoczynski et al[54]	1
Taifour et al[55]	1
Uzoigwe[56]	1

Success rate

Although success rates for prospective and retrospective studies were specified in Table 1 and 2, a combined VBAC-2 success rates calculated as 70.83% for the study population (excluding case studies and review articles). Similar findings by Tahseen and Griffiths and Whale and Woods for combined success rate.[8,15]

However, success rates of prospective and retrospective studies were found variable, prospective studies show 53.70% to 90%, and in retrospective studies success rate was 33% to 90%. Among the prospective studies highest success rate 90% reported by Chattopadhyay et al and lowest 53.70% by Hounkponou et al.[9,21] Remaining, Maroyi et al reported 76.1% and Granovsky et al 73%.[16,17] However, lowest success rate among the retrospective studies was 33% by Emembolu and highest 90% by Jamelle, and Vigorito et al each.[18-20] Similar report for highest success rate (90%) was reported by Mao and Shen.[13]

Uterine rupture

Among the prospective studies, Landon et al reported 0.9% of uterine rupture; Maroyi et al reported 0.4%, while, Chattopadhyay et al reported 0.8%.[16,21,24] From 29 retrospective studies 14 studies did not report uterine rupture incidence. Among the percentage of 15 studies, the lowest was Mesleh et al 0.3% and highest uterine rupture rate reported by Jamelle, was 10%.[19,23] Among the case studies, uterine rupture was reported by Indirayani et al was out of 3 cases, 1 uterine rupture incidence occurred.[23]

Blood transfusion

Among prospective studies, only Landon et al has specified transfusion 3.2%.[24] Out of 29 retrospective studies 18 have either not reported nor specified blood transfusion details. In the remaining 10 studies, the lowest transfusion percentage is 0.92% by Macones et al and highest transfusion percentage is 35% reported by Emembolu.[25,18]

Hysterectomy

In prospective studies Chattopadhyay et al and Landon et al reported 0.8% and 0.6% rates of hysterectomy respectively.[21,24] While, in 29 retrospective studies 24 studies have no hysterectomy done. Amongst remaining 5 studies, Phelan et al, and Rotem et al reported 0.2% hysterectomy rate; 1% Bretelle et al; 1.7% by Spaans et al and highest 3.63% by Pruett et al. [2,26-29]

Maternal outcome

In prospective studies maternal morbidity and complications reported were as follows; Maroyi et al (0.4%); Chattopadhyay et al (1.6%) and Landon et al (3.8%).[16,21,24] Whereas, of total 29 retrospective studies, 7 studies have not reported any morbidity of complications during VBAC-2. Among remaining 21 retrospective studies, Rotem et al; Spaans et al, Farmakides et al, Horgan et al and Phelan et al reported morbidity or complication below 2%.[2,26,28,30,31] While Roux et al, Mesleh et al, Macones et al, Bretelle et al, Dombrowski et al, Miller and Grobman, Asakura and Myers and Garg and Ekuma-Nkama reported the same from 2% to 4.5%.[3,22,25,27,32-35] These findings are similar to the study conducted by Tahseen and Griffiths.[8] Morbidity above 10% reported by Emembolu Jamelle, Pruett et al Modzelewski et al and 22% was reported by Davidson et al. [18,19,29,36,37]

Neonatal outcomes

Neonatal morbidity and complications in prospective studies, highest is reported by Chattopadhyay et al (2.6%) and lowest is by Landon et al (0.15%).[21,24] Among total 29 retrospective studies, 20 studies have not reported neonatal morbidity or complications. Out of remaining 9 studies, Macones et al, Dombrowski et al and Garg and Ekuma-Nkama, have reported morbidities and complications in between 1 to 1.34%.[2,32,35] While the highest morbidities and complications are reported by Breslin et al (10.5%), Emembolu (12%) and Wagner et al (12.4%).[18,38,39]

CONCLUSION

Analysis of the data gathered suggests that a trial for vaginal birth for women having a past of previous two or more caesarean sections is associated with average combined success rate of 70.83%. The proper patient selection remains of utmost importance in such cases. Risk of serious maternal and neonatal complications should be calculated carefully in the decision-making process. Overall, the success rate and low incidences of morbidity or complications are seen in this review; suggestive for trial for vaginal birth in selected patients after proper counselling and their consent.

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