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EXPERIENCE IN USING INTRAUTERINE BALLOON IN EARLY POSTPARTUM HEMORRHAGE

Early postpartum hemorrhage holds a position within the top reasons of maternal mortality, in spite of the fact that it is one of the manageable reasons. The risk of postpartum hemorrhage is worsened by Coronavirus pandemic due to dysregulation of hemostatic system in this disease. The use of intrauterine balloon gives an opportunity to affect the uterine tonus and mechanically close lumen of vessels gaping during postpartum hemorrhage. The world research medical books represent several works devoted to the use of intrauterine balloons and every researcher highlights its high efficiency, ease of use and minimal amount of side effects. In our research work we used 6 balloons in early postpartum hemorrhage and achieved affects in 83.3%. In 16.7% we had to do hysterectomy, in 16.7% we had to perform surgery to stop the hemorrhage, i.e. to do B-Lynch compression suture. The presence of balloon in uterus did not lead to any suppurative-septic complications, nor changed the parameters of coagulation test and biochemical blood test. The Hb level remained stable both when balloon was in the uterus and when discharged from hospital. Thus, the use of balloon to stop early postpartum hemorrhage has proven its efficacy confirmed during practical experience and evidence-based sources.

Key words: early postpartum hemorrhage, intrauterine balloon, uterine tonus, hysterectomy, B-Lynch compression suture.

Introduction

Early postpartum hemorrhages rank as one of the top reasons of maternal mortality in the world. The National Vital Statistics System (NVSS) reports that in 2018 the maternal mortality rate was 17.4, in 2019 this rate became 20.1 per 100 thousand of live births, [1], in 2020 we failed to find any accurate information in the open sources on maternal mortality rate. «In Kazakhstan maternal mortality rate has increased 20.8 times, states the President Kassym-Zhomart Tokayev during the extended session of the Government. As per the report of the Minister of Health, «The maternal mortality rate in 2020 reached its tragic thresholds, since it increased almost three times and made up 36.5 per 100,000 live births against the planned value of 17.1. In addition 36.5 is an average level for the Republic. As for the other regions the numbers are more frightening and reach up to 70, sometimes up to 95 per 100,000 live births» [2]. According to the Lancet, the reasons of maternal deaths in 2014-2019 comprise early postpartum hemorrhages, then hypertensive complications [3], and the reasons of deaths have not changed. In COVID-19 environment the numberof postpartum hemorrhages increased mainly due to pathogenesis of injury of blood coagulation system by the virus [4].

When arresting massive postpartum hemorrhage there is a large role of impact on all the factors that lead to hemorrhage arrest, i.e. on blood coagulation system, uterine tonus and vessel lumen. Insertion of intrauterine balloon has an impact both on uterine tonus and vessel lumen. The method of inserting intrauterine balloon [5,6,7,8,9,10] is used throughout the entire world and is presented in the clinical practice guideline of the Republican Center for Health Development «Postpartum Hemorrhage» as of 2016 [11].

We have conducted an effectiveness study of intrauterine balloons produced by a local company «Almerek» to treat early postpartum hemorrhage.

Materials and Methods

Intrauterine balloons were randomly insert- ed to 6 women who had postpartum hemorrhage.

Study methods included clinical and statistical ones. Intrauterine balloon consists of silicone bal- loon, two hollow pipes, two syringes and two caps. A fluid injected into the balloon creates required pressure in the cavity of uterus. The techniques of balloon tamponade are as follows. In case of 500- 600 ml blood loss and unstable uterine tonus re- vealed upon manual examination the balloon was inserted into the uterus cavity and the top of the balloon folded dome reached the uterine fundus. Further saline solution was injected to the balloon with two syringes by turns. Usually in 10-15 min- utes, rarely in 60 minutes there appeared signs of restoring contractile function of uterus. No bleed- ing in the pipe located in the vagina within 30-40 minu- tes allowed considering that tamponade was complete and successful. Similar techniques were performed with 6 obstetric patients. The balloon is equipped with two syringes for quick intake of re- quired volume. The syringes were fixed and later could regulate volume in the balloon. There is al-so a spe- cial drainage to control possible bleeding. The patients did not have any sense of discomfort and stayed in the post-natal wards with the balloon located in their uterus cavity under the supervision of paramedics.

Results and Discussion

The age of women varied between 25 and 41, whereas the average age was 32.3±0,6. The parity comprised 1 to 6, average parity being 3.3. Among them 3 were pulripara (50%), 1 with burdened an- amnesis (16.7%). Figure 1. shows gestation course and complications with patients.

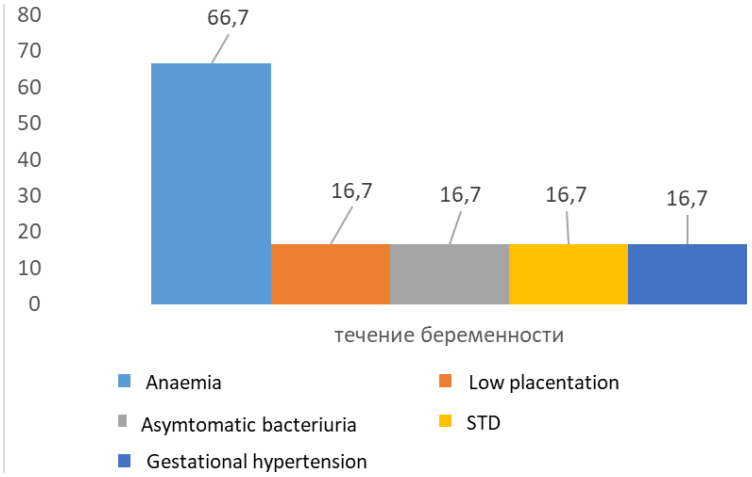

Figure 1 – Gestation course and its complications

Thus, patients during the gestation period fre- quently demonstrated moderate anaemia 66.7%, 1 patient was with asymptomatic bacteriuria (16.7%), 1 with low placentation and 1 with STD in our case it was ureaplasmosis. Figure 2 shows extragenital diseases of patients.

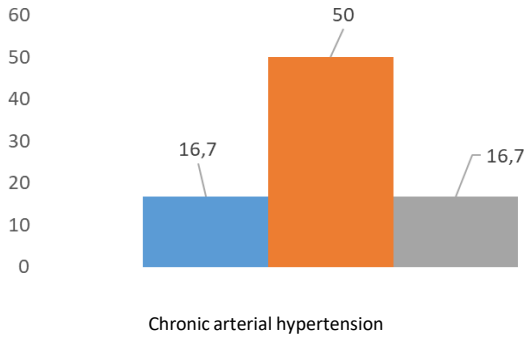

Figure 2 – Extragenital diseases

The top extragenital diseases include anaemia (50%), and 1 case (16.7%) in each of chronic arterial hypertension and thyroid disorders.

All patients performed delivery naturally full-term, of which 2 (33.3%) had labor induction because of gestational arterial hypertension (16/7%) and tendency to postterm pregnancy (16/7%). Length of labor did not exceed physiological values and constituted 5 to 9 hours. Duration of the second period of labor took 20 to 65 minutes. All children were born in good condition with Apgar score being 7-8. Fetal weight varied between 2,885 and 4,865 g, average fetal weight was 3806±200. One patient (16.7%) had a bleeding in 15 minutes after delivery, the rest had it in 5 minutes after delivery. Catheter insertion took about 3 to 5 minutes and in 20-50 minutes (on the average 28 minutes) hemorrhage was arrested. Duration of balloon presence in uterus lasted from 4 to 7 hours, on the average being 5.4 hours. One patient (16.7%) had hemorrhage continued which led to hysterectomy, total blood loss was 2,000 ml. In addition, another patient had to have B-Lynch compression sutures, but the reproductive function was preserved. Maximal Hb level decrease (76g/l) was observed with one patient (16.7%) who had hysterectomy. She also had her coagulation test results changed to hypercoagulation and slight hypoproteinemia and hyperglycemia. For the remaining women parameters of blood coagulation and biochemical indices remained stable. Hb level of women being discharged varied between 87 and 111 g/l, on the average being 103.17 g/l. Total extent of blood loss was 700-2,000 ml, on the average – 941.67±220 ml. Clinical blood analysis of 2 women (33.3%) being discharged from hospital showed slight leukocytosis, where-as it was within the normal limits with the rest. Duration of staying in maternity clinic varied between 2 to 6 days, on the average – 3.33 days (Table 1).

Table 1 – Patients' Data

N	Age, years	EGD and gestation course	Parity	Delivered course	Extent of blood loss, ml	Fetal weight, g	Duration of balloon being in uterus	Hb g/l	Outcome
1	41	Anaemia, STD	P-5, C-5	1st period – 5 hours, 2nd period 40 minutes	800	4280	6 hours	106	Discharged
2	35	Anaemia, autoimmune thyroiditis	P-6, C-5, A-1	1st period 4 hours 40 minutes, 2nd period – 20 minutes	800	4100	7 hours	107	Discharged
3	35	Anaemia,	P-2, C-2	1st period – 9 hours 30 minutes, 2nd period – 35 minutes	850	3478	6 hours	107	Discharged
4	32	Asymptomatic bacteriuria	P-4, C-4	1st period -9 hours 15 minutes, 2nd period – 21 minutes	800	4865	4 hours	111	Discharged
5	25	Anaemia, low placentation	P-1, C-1	1st period – 9 hours 15 minutes, 2nd period – 65 minutes	900	220	4 hours	101	B-Lynch seams
6	26	Anaemia, gestational hypertension, affected by chronic arterial hypertension	P-2, C-2	1st period – 9 hours, 2nd period – 22 minutes	2000	2885	10 minutes	76	hysterectomy

Given the small number of cases using the balloons, we have entered all data into table 1 for better analysis.

Conclusion

Early postpartum hemorrhage holds a position within the top reasons of maternal mortality, inspite of the fact that it is one of the manageable reasons. Thus, extending methodology of con- trolling bleeding is relevant to the whole world.In the world research books there are not many ar- ticles on how to use balloons, however, all sourc-es somehow confirm their efficiency and ease of use. Some authors show efficiency of use beingup to 99% [12,13,14,15]. The use of intrauterine balloons to arrest postpartum hemorrhage has ef- ficiency of 66.6%, since in 16.7% only a hysterectomy had to be done, in 16.7% surgery had to be performed to arrest bleeding, i.e. B-Lynch compression suture. The presence of balloon in uterus did not lead to any suppurative-septic complications, nor changed the parameters of coagulation test and biochemical blood test. The Hb level did not critically decrease both when balloon was inthe uterus and when discharged from hospital. We did not aim at calculating the economic efficien-cy of balloon, but it seems obvious now. Thus, the use of balloon to stop early postpartum hem- orrhage has proven its efficacy confirmed during practical experience and evidence-based sources.Convenience of using locally produced balloons entails that this model has special appliances for syringes which allows quicker intake of required volume to fill the uterus cavity, and this is not pro- vided in many of the foreign models.

References

1. NCHS reports can be downloaded from: https://www.cdc.gov/nchs/products/index.htm
2. Forbes.com LLC™ All Rights Reserved https://forbes.kz/news/2021/06/23/newsid_252600
3. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, Gülmezoglu AM, Temmerman M, Alkema L. Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health. 2014 Jun;2(6):e323-33. doi: 10.1016/S2214- 109X(14)70227-X. Epub 2014 May 5. PMID: 25103301.
4. Terpos E, Ntanasis-Stathopoulos I, Elalamy I, Kastritis E, Sergentanis TN, Politou M, Psaltopoulou T, Gerotziafas G, Dimopoulos MA. Hematological findings and complications of COVID-19. Am J Hematol. 2020 Jul;95(7):834-847. doi: 10.1002/ajh.25829. Epub 2020 May 23. PMID: 32282949; PMCID: PMC7262337.
5. Victor Dabelea , Peter M Schultze, Robert S McDuffie Jr, Intrauterine balloon tamponade in the management of postpartum hemorrhage 2007 Jun;24(6):359-64.doi: 10.1055/s-2007-984402. Epub 2007 Jun 13. https://pubmed.ncbi.nlm.nih.gov/17566947/
6. Erum Saleem Khan , Ayesha Basharat Successful use of balloon tamponade in the management of postpartum hemorrhage in a case of bicornuate uterus 2018 May 17;6:2050313X18776174. doi: 10.1177/2050313X18776174. eCollection 2018. https://pubmed.ncbi.nlm.nih.gov/29796270/
7. Çetin BA, Aydogan Mathyk B, Atis Aydin A, Koroglu N, Yalcin Bahat P, Temel Yuksel I, Topcu EG, Ozdemir I. Comparing success rates of the Hayman compression suture and the Bakri balloon tamponade. J Matern Fetal Neonatal Med. 2019 Sep;32(18):3034-3038. doi: 10.1080/14767058.2018.1455184. Epub 2018 Apr 2. PMID: 29558231.
8. Kavak SB, Kavak EÇ, Demirel I, Ilhan R. Double-balloon tamponade in the management of postpartum hemorrhage: a case series. Ther Clin Risk Manag. 2014 Aug 2;10:615-20. doi: 10.2147/TCRM.S62574. PMID: 25120367; PMCID: PMC4128843.
9. Kaya B, Tuten A, Daglar K, Misirlioglu M, Polat M, Yildirim Y, Unal O, Kilic GS, Guralp O. Balloon tamponade for the management of postpartum uterine hemorrhage. J Perinat Med. 2014 Nov;42(6):745-53. doi: 10.1515/jpm-2013-0336. PMID: 24663227.
10. Cengiz H, Dagdeviren H, Kaya C, Yildiz S, Ekin M. Successful management of a second-trimester post-abortion hemorrhage with the Bakri balloon tamponade. Clin Exp Obstet Gynecol. 2015;42(2):246-7. PMID: 26054131.
11. Clinical practice guideline of the Republican Center for Health Development «Postpartum Hemorrhage», 2016 https://diseases.medelement.com/disease
12 Pendleton A. A., Natarajan A., Ahn R., Nelson B. D. et al. A qualitative assessment of the impact of a uterine balloon tamponade package on decisions regarding the role of emergency hysterectomy in women with uncontrolled postpartum haemorrhage inKenya and Senegal. BMJ Open. 2016. http://bmjopen.bmj.com/content/6/1/e010083.long (дата обращения — 28.08.2017).
13. Ferrazzani S, Iadarola R, Perrelli A, Botta A, Moresi S, Salvi S, Santucci S, Degennaro VA, De Carolis S. Use of an intrauterine inflated catheter balloon in massive post-partum hemorrhage: a series of 52 cases. J Obstet Gynaecol Res. 2014 Jun;40(6):1603-10. doi: 10.1111/jog.12404. PMID: 24888923.
14. Albayrak M, Ozdemir I, Koc O, Demiraran Y. Post-partum haemorrhage from the lower uterine segment secondary to placenta praevia/accreta: successful conservative management with Foley balloon tamponade. Aust N Z J Obstet Gynaecol. 2011 Aug;51(4):377-80. doi: 10.1111/j.1479-828X.2011.01309.x. Epub 2011 Apr 18. PMID: 21806571..
15. Natarajan A, Kamara J, Ahn R, Nelson BD, Eckardt MJ, Williams AM, Kargbo SA, Burke TF. Provider experience of uterine balloon tamponade for the management of postpartum hemorrhage in Sierra Leone. Int J Gynaecol Obstet. 2016 Jul;134(1):83-6. doi: 10.1016/j.ijgo.2015.10.026. Epub 2016 Mar 21. PMID: 27085981