Original Article

Role of Internal Iliac Artery Ligation in Severe Obstetric Haemorrhage: Still Alive

Rubaba Abid[1], Attiya Begum [2], Rubina Irfan[3] , Fehmida Shaheen[4]

[1-3]Assistant Professors, [4]Professor, All from Dept. of Obs & Gynae, Holy Family Hospital, Rawalpindi.

***Address of Correspondence**: Dr. Rubaba Abid, Assistant Professor, Dept. of Obs & Gynae, Holy Family Hospital, Rawalpindi Email: rubaba_abid@yahoo.com*

Abstract

Objective: To study the efficacy and outcome of bilateral internal iliac artery ligation in obstetric cases.
Study Design: Retrospective observational study.
Place & Duration of study: Dept. of Obs/Gynae unit II Holy Family Hospital. Rawalpindi from January 2012 to December 2014.
Methodology: Women admitted to HFH who underwent BIAL to control or prevent haemorrhage.
Main outcome measures were
1). Any complication of the procedure. 2) The need for re-laparotomy.
In this study we analyzed 12 cases of BIAL which was done to control excessive pelvic and post partum haemorrhage.
Results: During this period we had 18,291 deliveries in our unit. Bilateral internal iliac artery ligation was performed on 12 patients. It was done in 5 (41.6%) for primary PPH, 2 (16%) for secondary PPH, 2 (16%) for uterine rupture, 2 (16%) for post hysterectomy referral to tertiary care hospital for intraperitoneal bleed, 1(8.3%) for broad ligament haematoma and persistent shock after caesarean section in rural settings. Haemostasis was secured in all patients, however 2(16%) died due to complications e.g. septicemia, DIC and multiorgan failure. Hysterectomy was done in 7(58.3%) patients. Uterus was conserved in 5(41.6%) patients. No complication regarding procedure of BIAL was observed.
Conclusion: BIAL is a life saving procedure along with being a fertility sparing method especially in low resource countries.
Keywords: Bilateral internal iliac artery ligation (BIAL), Pelvic hemorrhage.

Cite this article as: Abid R, Begum A. Irfan R, Shaheen F. Role of Internal Iliac Artery Ligation in Severe Obstetric Haemorrhage: Still Alive . J. Soc. Obstet. Gynaecol. Pak. 2016; Vol 6(1):12-16.

Introduction

Bilateral internal iliac artery ligation (BIAL)is a time tested method of controlling pelvic as well as post partum haemorrhage. The pioneer of it is Sir Howard Kelly who did it in 1894 to control haemorrhage during hysterectomy for endometrial carcinoma.[1] Later Mangert WF[2] et al and Burchell RC[3] did extensive work on it to endorse it as a useful procedure.

Pelvic haemorrhage intra or postoperative occurs mainly due to any vascular injury or failure to ligate the bleeding vessels adequately. Primary post partum haemorrhage however results mostly due to uterine atony followed by retained products of conception, abnormalities of placental insertion and uterine rupture.[2]

Defective coagulation due to excessive haemorrhage are among the contributing factors towards

Authorship Contribution: [1]Conception of idea, proforma making, article writing, [2,3]Data collection, data analysis, [3] Supervised, Proof reading, [4]Reviewed the Study.

Funding Source: none
Conflict of Interest: none

Received: Mar 1, 2016
Accepted: May 2, 2016

haemodynamic instability in such cases.

An insight into the anatomic distribution of the pelvic blood supply, and the knowledge about the preventive ways and means for the timely control of the blood loss can reduce the maternal morbidity and mortality. BIAL decreases pulse pressure of the arterial system by 85% and reduces blood flow in arteries distal to the ligation by 48%. Thereafter the arterial pressure becomes the same as venous pressure, thus facilitating clot formation rendering it more amenable to haemostasis by clot formation.[4]

This is evident in cases of major degree placenta previa, uterine rupture, broad ligament haematoma and cervical pregnancy.[5]

Besides controlling haemorrhage BIAL is an effective fertility sparing procedure.[5] Success rate of BIAL is reported to be 40% to 100% and the procedure prevents hysterectomy in 50% of the cases according to different studies.[6]

The purpose of the study was to evaluate the effectiveness of BIAL in saving maternal life, with or without hysterectomy

Methodology

The study was conducted in Gynae Unit II of Holy Family hospital Rawalpindi. It was a retrospective observational study carried from January 2012 till December 2014.

Referrals of complicated cases are received from the city and periphery. Life threatening emergencies like severe primary post partum haemorrhage due to uterine atony and uterine rupture are encountered. Even caesarean sections, hysterectomies and ERPC done elsewhere with intraperitoneal bleeds are also seen.

In this study we analyzed 12 cases of BIAL which was done to control excessive pelvic and post partum haemorrhage.

During laparotomy, the retroperitoneal space was entered at the level of the common iliac artery bifurcation and internal iliac artery was identified. The anterior division of the internal iliac artery was ligated 5 cm distal from the common iliac bifurcation.

The relevant information for each case was recorded with maternal age, gravidity, parity, obstetric pathology that led to IAL ligation, volume of blood and blood product transfusions, uterus conservation and length of hospital stay.

Critical analysis of the cases was done in terms of failure rate, associated complications, conservation of the uterus and maternal death.

Results

Total no. of deliveries conducted in gynae unit II. Holy Family Hospital during this period was 18,291.

During this period 12 patients underwent BIAL. Detailed characteristics of these patients are shown in table I.

Sr.No (Patient)	Age (Years)	Parity	Diagnosis including gestational age	Causes of Haemorrhage / PPH	Hys.	Mode of Delivery / Place	No. of blood units + FFP's	Outcome Complications	Hospital Stay in Day(s)
1.	30	P_7	Home delivery of FTP,PPH(shock)	Uterine rupture and bleeding	Yes	SVD/ Murree	4+3	Shifted to SICU	15
2.	25	PG	35^{+} weeks of abruption + DIC of PPH	Uterine atony	Yes	LSCS / HFH	5+6	SICU	18
3.	28	$G_4P_1^{+2}$	Previous scar now at 23 weeks PPH	Uterine atony	Yes	SVD / HFH	4+3	Nil	12
4.	26	$G_3P_2^{+0}$	Previous two scar	Sec. PPH	No	LSCS / Jhelum	4+2	Nil	10
5.	30	P_2	Previous two scar	Broad ligament hematoma	No	LSCS / Kahuta	7+8	MICU on ventilator , neurological deficits	35
6.	28	P_1	Delivered at FTP – PPH Hysterectomy at private clinic Shock	Uterine atony Intraperitoneal bleed	Yes	SVD / Pvt. Clinic	6+10	Re-opened d/t I/P bleed BIAL MICU on ventilator	Died on 8

Table I continued..

Sr.No (Patient)	Age (Years)	Parity	Diagnosis including gestational age	Causes of Haemorrhage / PPH	Hys.	Mode of Delivery / Place	No. of blood units + FFP's	Outcome Complications	Hospital Stay in Day(s)
7.	30	P_4	LSCS / PPH	Uterine atony	Yes	LSCS / Pvt. Clinic	8+6	Reopened IAL ,Hysterectomy SICU	Died after 1
8.	26	PG	39 weeks IOL delivered PPH	Uterine atony	No B-lynch + IAL	SVD / HFH	9+14	Shifted to MICU on ventilator	16
9.	28	$G_5P_3^{+1}$	Previous hysterotomy at 30wks abruptio placentae	Scar dehiscence	Yes	Emergency laparotomy	4+11	SICU	18
10.	28	P_3	Previous 2 scar H/O ERPC for 4m gestation , expulsion, hysterectomy in pvt hosp.	Acute abdomen reopened	Yes	Miscarriage	4+6	SICU	14
11.	30	$G_3P_2^{+0}$	Previous 1 scar 12 wks with delayed miscarriages referred from periphery fever, jaundice and acute abdomen	Laparotomy Ruptured scar IAL	No	Miscarriage	7+6	SICU on ventilator	14
12.	25	P_3^{+0}	Secondary PPH after FTP SVD	Sec. PPH RPOC's infection	No / Laparotomy, IAL	SVD /	5+4		7

The average age of the patient was 27 years, ranging from 25 to 30 years. Only 2(16%) were primigravida whereas 1(8.3%) was para 7. The remaining 9(75%) patients were from para 1 to para 4.

5 (41.6%) patients had primary PPH due to uterine atony whereas 2(8.3%) patients had secondary pph. 3(25%) patients presented with uterine rupture. 2(16.6%) patients had emergency laparotomy due to broad ligament haematoma.

Hysterectomy was conducted in 7(58.3%) patients, whereas fertility was conserved in 5(41.66%) patients.

5 (41.6%) patients delivered vaginally followed by postpartum haemorrhage. 4(30.3%) patients had LSCS which resulted in surgical complications like broad ligament haematoma and secondary PPH due to endometritis.

Most of the patients i.e 7(58.3%) were resuscitated by 4-5 U of blood and its products. Maternal mortality was seen in 2(16%) patients.

Discussion

Internal iliac ligation - a method to control pelvic haemorrhage is seen to be very effective in saving the lives of women in severe haemorrhage due to obstetric and gynaecological cases. It also plays a vital role in preserving the fertility of a woman, which has a great impact on the social life of women especially of the third world countries.[7,8]

According to a study of the haemodynamics of the pelvic cavity by Burchell, it was seen that after BIAL the pelvic blood flow reduced by 49% and venous pressure reduced by 85%. This easily led to effective haemostasis.[4]

Our study has a limited number of patients which corresponds with international data on this subject because of the nature of the operative procedure.[6,8]

To give a little background of this procedure, Internal iliac ligation is a method to control pelvic haemorrhage which is being practiced since almost a 100 years. Although a lot of innovations have been made for controlling pelvic haemorrhage by medical methods, IAL is still very popular because of its effectiveness.

There are different methods to control obstetric haemorrhage e.g. stepwise devascularisation i.e. uterine and ovarian artery ligation.[1] Application of B-Lynch suture is also an effective method to control PPH due to uterine atony. It compresses and envelops the uterus producing a result similar to manual compression but complications like uterine ischemia or necrosis do occur.[9] Moreover it is not possible in cases of severe abruption placentae and 'couvelaire' uterus.

In our study the commonest cause of post partum haemorrhage was uterine atony i.e. in 5(41.6%) patients. These figures correspond with a study conducted in Turkey in 2012.[10] In other international

studies uterine atony is found to be the commonest cause of PPH.[7,13]

Uterine conservation was possible in 5(41.66%) patients. The international statistics show uterine preservation with BIAL to be 40% to 100%.[6]

Overall success of this procedure was seen in 10(84%) patients. Two patients died .Both of them reported in a serious condition. One had peripartum hysterectomy in a private hospital and was referred to Holy Family hospital with intraperitoneal bleed. She was re-operated and BIAL was done but died due to septicemia, DIC and multiorgan failure. The second patient had caesarean section in a private clinic and was brought with primary pph. She was also re-opened and hysterectomy with BIAL was done. She also died due to DIC and multiorgan failure. Our success rate is similar to a study conducted by Unal et al who found BIAL to be effective in 87.9% of patients.[10] Similarly Chelli et al reported a success rate of 82.45%.[11] Mukherjee et al also had a success rate of 83.3%[12] Thus BIAL is a life saving procedure and proves to be an effective tool in controlling pelvic haemorrhage.

However the expertise to perform it is a must to minimize the side effects. No procedure related complication e.g. Ureteric or major vessel injury or inadvertent ligature of the external iliac artery were encountered by us as reported in the literature.[14]

Peripartum hysterectomy was considered as a last resort to control pelvic haemorrhage in cases of uterine atony refractive to medical therapy, uterine rupture and placental invasive abnormalities. But it is seen that BIAL is not only an effective method to control pelvic haemorrhage but has an additional advantage of preservation of the fertility of the patient.

In our study uterine conservation was possible in 5(41.6%) patients, which is supported by other studies showing this to be 40% to 100%[6]. It was seen that the additional application of B-Lynch suture was required for case of uterine atony.[13,15]

Internal iliac ligation was found to be very successful in cases of secondary PPH.[15,16] We had 2 (16.6%) cases of secondary PPH after caesarean section. Both responded well to this procedure and the moderate to severe bleeding was reduced to almost nil miraculously after BIAL.

Uterine rupture is another indication requiring IAL for better haemostasis. Our hospital is a university hospital so it receives obstetric cases with complications from the periphery as well as local private health care facilities. There were 3(25%) patients with uterine rupture, the second commonest cause of severe PPH.[17,18] One was seen in our study to occur in an unscarred uterus whereas the other 2 had previous scar. Scar was repaired and uterus was conserved along with BIAL in 1(8.3%) patient. Whereas the other 2(16.6%) required hysterectomy and BIAL as there was a big broad ligament haematoma and open ends of the vessels could not be located. Similar results were observed in a study by Siddik et al who did BIAL, in cases of uterine rupture but were able to conserve the uterus in 1 patient only. Although uterine artery ligation can be employed in cases where repair is attempted but it is seen that IAL is more effective in controlling uterine, cervical and vaginal arterial supply.[19,20,21]

Thus it is observed that IAL is a safe, rapid and effective method to control pelvic and postpartum haemorrhage.

Conclusion

The safety and efficacy of BIAL is proved by our study but larger randomized controlled trials are needed to further support it. Moreover it should be tried as a first option in young women of low parity. It is the need of the hour to train young obstetricians how to perform BIAL, to avoid delay in carrying out this procedure.

References

1. Mandal D, Mandal S, Maity T. K et al. Role of hypogastric artery in pelvic haemorrhage is still alive. Al Ameen J Med Sci. 2013;6(1):12-16.
2. Bangal V, Kwatra A, Raghav S; Role of internal iliac artery ligation in control of pelvic haemorrahge. Pravara Med Rev. 2009;1(2):23-25.
3. Mukhopadhyay P Naskar T, Hazra S. J Obstet gynaecol India. 2005; 55(2):144-145.
4. Burchell RC. Physiology of Internal Iliac artery ligation.J Obstet Gynecol Br commonwealth.1968;75:642-651.
5. Bleich AT, Rahn DD Weilander CK et al. Posterior division of internal iliac artery: anatomic variation and clinical applications. AJOG,2007;197(6):658 el- 658 e5.
6. Perveen F, Memon GU, Rabia S. Use of bilateral internal iliac artery ligation for controlling severe obstetric haemorrahge Pak J Med Sci. 2011;27(1):94-97.
7. Joshi V, Otiv S, Majumder R, Nikam Y, Shrivastava M. Internal iliac artery ligaiton for arresting post partum haemorrahge. BJOG. 2007;114:356-361.
8. Wagaarachchi PT, Fernando L Fertility following ligation of internal iliac arteries for life threatening obstetric haemorrhage .Hum Reprod.2000;15:1311-1313.
9. EL Hamamy E, Partial ischemic necrosis of the uterus following a uterine brace compression suture. BJOG. 2005;112:126-127.
10. Unal O, Kars B, Buyak Bayrak EE, Karsidag AY, Turan C. The effectiveness of bilateral hypogastric artery

ligation for obstetric haemorrahge in three different underlying conditions and its impact on future fertility. J Matern Fetal Neonatal Med. 2011;24(10):1273-1276.
11. Chelli D, Boudaya F, Dimasse K, Gharbi B, Najjar I, Sfar E etal. Hypogastric artery ligation for postpartum haemorrhage. J Gynecol Obstet Biol Reprod (Pairs). 2010;39(1):43-49.
12. Mukherjee P, Das C, Mukherjee G et al. Emergency internal iliac artery ligation haemorrahge. J Obstet Gynecol Ind 2002;52:147-149.
13. Papp Z, Toth-Pal E, Papp C, et al. Hypogastric artery. Ligation for intractable pelvic hemorrhage. Int J Gynecol Obstet 2006;92:27-31.
14. Camuzeuoglu H, Toy H, Vural M, Yildiz F, Aydin H. Internal artery ligation for severe post partum haemorrhage and severe haemorrhage after post partum hysterectomy. J Obstet Gynecol Res. 2010;36(3):538-543.
15. J wata A, Murayama. Y, Itakura A et al. Limitations of internal iliac artery ligation for the reduction of intraoperative haemorrahge during caesarean hysterectomy in cases of placenta previa accreta. J Obstet Gynecol Res. 2010;36:254-259.
16. Porreco R, Stettler R. Surgical remedies to post partum haemorrahge. Clinic Obstet Gynecol. 2010;53:182-195.
17. Yalinkaya A , Guzel A, Kangal K, Emergency peripartum hysterectomy : 16 year experience of a medical hospital.J Chin Med Assoc. 2010; 73: 360-363.
18. Evsen M, Sak M, Bozkurt Y, et al. Uterine rupture. Regional incidence, causes and treatment. Dicle Medical Journal. 2008;35:260-264.
19. Laung NY, Lau AC, Chan KK, Yan WW, Clinical characteristic and outcomes of obstetric patients admitted to the intensive care unit: a 10 year retrospective review. Hong Kong Med J. 2010;16(1):18-25.
20. Siddik EM, Erdal SM, Ender SH et al. Internal iliac artery ligation for severe post partum haemorrahge. Ginekol Pol. 2012; 83:665-668.
21. Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van look PK. WHO analysis of causes of maternal death: A systematic review. Lancet 2006;367:1066-1074.