International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2019; 3(6): 01-04
Received: 01-09-2019
Accepted: 05-10-2019

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The bilateral internal iliac/hypo gastric artery ligation (BIIAL) vs. other surgical procedures for the management of pelvic hemorrhage

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DOI: https://doi.org/10.33545/gynae.2019.v3.i6a.382

Abstract
The bilateral internal iliac / hypo gastric artery ligation (BIIAL) vs. other surgical procedures for the management of pelvic hemorrhage.
Aims & Objectives: To find out its (BIIAL) effectiveness. Study design:-clinical, interventional, prospective randomized control trial (r.c.t).
Place & Duration: In the dep't of g & o, ipgme & r-sskm hospital Kolkata, west Bengal, India, more than one (1) year.
Methods & Materials: After getting ethics approval, about one hundred (100 -patients) of pelvic hemorrhage patients (Due to obstetrics & gynecological in origins) selected, randomized and allowed into two groups for management point of view like:-gr. a (n=50) =cases -by bilateral int. iliac artery ligation (BIIAL) & gr-b (n=50) =controls –by other surgical procedures (Compression sutures-lynch stitches, stepwise- uterus- ovarian vessels ligation, exploratory laparotomy with proceeds may end with hysterectomy).
Results & Analysis: The results of individual group (Gr.A & Gr.B), assessed (pry & sec. outcome), analyzed, represented with statistical significant accordingly showed that there are better outcomes in B.I.I.A.L. in all aspects with zero mortality.
Conclusion: Whatever may be the etiology, being operating surgeon must do BIIAL first than proceeds to control fatal pelvic hemorrhage.

Keywords: Pelvic hemorrhage –laparotomy-devascularization-compression sutures-hysterectomy -BIIAL

Introduction
'It is easier to stay out of trouble than to get out of trouble'. The pelvic hemorrhage is a potential complication may occur intra-operative, post-operative and post-partum hemorrhage as a result of unexplained, undetected, unexpected and inappropriate vascular injury and its subsequent management in patient undergoing operations. The prevention and control such bleeding is fundamental to success of any surgery. The different surgical options are BIIAL [1, 2], compression sutures [3], B-lynch stitches [4], stepwise uterus-ovarian vessel ligation [5], exploratory laparotomy with proceed up to hysterectomy and most modern interventional radiology which excluded (Due to its cost, serious condition of the patient and HOLUB *et al.* increased risk of spontaneous miscarriage and pregnancy complications). Among these procedures BIIAL/BHAL is safe, easy to perform with minimal intra and post-operative complication, conversion of arterial to venous circulation developed homeostasis by simple clot formation not compromised pelvic circulation due to collateral formation and preserve fertility. The uncontrolled hemorrhage during surgery not controlled by uterus-ovarian vessels blocked even not responding to hysterectomy may require bilateral internal iliac artery ligation (BIIAL) [6]. In this study the primary and secondary outcomes in forms are better in Gr-A-CASES (BIIAL/BHAL-safe, easy to perform, and superior to others –less operation time, less morbidity, mortality), with ZERO mortality than Gr-B-CONTROLS even better than Clark's [7] series 57% effective. Nowadays though pelvic floor specialist or vascular surgeons called-upon but Gynecological & Obstetric Surgeons are competent enough to perform BIIAL /BHAL. Like most author recommendations-incorporation into curriculum –Learn, Practice, Acquire.

Methods & Materials

After getting ethics approval patients of pelvic hemorrhage are selected, randomized and allowed into two groups as per selection and exclusion criteria with Consort- Flowchart as below

Gr-a-cases (50) -bilateral internal iliac artery ligation (biial/bhal).

gr-b-controls (50) -other surgical procedures (Compression sutures- B-Lynch stitches, Stepwise- uterus- ovarian vessels ligation, Exploratory Laparotomy with proceeds may end with hysterectomy).

Case selection

Pelvic hemorrhage of Obstetrics causes (49%) & Gynecology origins (26) and exploratory laparotomy for haemoperitoneum (25%) Total=100.

Exclusion criteria

1. Coagulation disorder& bleeding diathesis.
2. Immunocompromised and infective condition.
3. Associated Medical and Surgical Co-morbidities.
4. Rectus sheath hematoma.

Sample size :> 100 (one hundred). Place of study: department of gynecology and obstetrics, ipgmer - sskm hospital. West Bengal. India. Period of study: 1 (one) year. Study design prospective randomized clinical control trial, comparative study, original research journal article.

Results and Analysis

In Obstetrics cases (49%= APH-15, PPH-15, D/E-2, Rupture ut-2, Cx & Cornual pregnancy-3, During c/s & broad ligament hematoma -12), Gynecological origins (26%=Radical oophorectomy-4, Radical hysterectomy-10, TAH-BSO-6, NDVH-2, DUB-2, Vaginal Cystectomy-2), Post-operative haemoperitoneum (25%-Post c/s- 14, Post ligation-2, TAH-BSO-3, VH-PFR-2, Post myomectomy-4).

Exploratory laparotomy &Emergency-hysterectomy (30%), Stepwise Pelvic- devascularisation –Uterine& ovarian vessels-ligation (35%), Compression stitches – B-Lynches & others (40%) were carried out in fifty (50) - Controls, BIIAL/BHAL done in fifty patients (100%-50- CASES) demonstrated in BIIAL/BHAL group 100% effective to control hemorrhage and no additional method required and Zero mortality but in other surgical methods group (Compression stitches-35%, Utero ovarian vessels ligation-35%, Exploration and hysterectomy-30%) controls bleeding (55.5%), additional method BIIAL/BHAL required 44.5% and Emergency- Hysterectomy needed (6= 12 %) and death (3=6%). The outcomes of individual groups analyzed as primary outcome (organ damage/failure, blood loss, transfusion), secondary outcome (Early) (operation time, mobilization time, oral intake time, analgesic, pain relieved and satisfaction), secondary outcome (Late) (wound complications, hospital stay, costs and readmission) tabulated and statistical significant calculated by graph-pad software in Table 1, Table 2.

Table 1: Primy outcome of both groups (Cases vs. Controls)

Indicators	Gr-A=CASES (N=50)	Gr-B=CONTROLS (N=50)	UTT &FET with two tailed-p-value.
Blood Loss (1200—1800ml) Hb% Drop (Pre &Post) PCV Drop. Mops wt Drain Operation After 8 hrs	*1200, *100, *14.14. *0.40, *0.05, *0.0071 *1.8, *0.1, *0.014. *1400, *200, *28.28. *500, *150, *21.21. *100, *30, *4.25.	*1800, *300, *42.43. *1, *0.05, *0.0071. *2.7, *0.05, *0.0071. *1700, *300, *42.43. *800, *300, *42.43. *300, * 50, *7.07.	<0.0001. <0.0001. <0.0001. <0.0001. <0.0001. <0.0001.
Transfusion Required:- Crystalloids Colloids Blood Platelets FFP	 40/10 10/40 03/47 03/47	 50/00 50/00 40/00 40/00	 P=0.0012. P<0.0001. P<0.0001. P<0.0001.
Organ Damage and Dysfunction:- Ureteric Injury Bladder Injury Voiding Dysfunction Intestine Injury Vessels Injury	 01 03/47 03 01 03/47	 05 12/38 05 03 11/39	 P=0.0226. P=0.0407.
Thromboembolic Manifestion	00	02	
ITU / CCU /HDU Case	5/45	20/30	P<0.0010.
Death	NIL	02	

Unpaired –t-test (UTT), Fisher Exact test (FET), *Mean, *SD, *SEM.

Table 2: Secondary Outcome

Indicator	Gr-A-CASES-N-50.	Gr-B-CONTROLS-N-50.	UTT &FET with two tailed - P-Value.
Operation Time	*90, *15, *2.12	*120, *30, *4.24.	<0.0001.
Mobilization Time	*16, *4, *0.57.	*40, *6, *0.85.	<0.0001.
Oral Feeding Time	*24, *4, *0.57.	*40, *6, *0.85.	<0.0001.
Bowel Movement	*24, *4, *0.57.	*48, *6, *0.85.	<0.0001.
Severe Pain	7/43	17/33	P=0.0338.
Analgesic Require	*24, *4, *0.57.	*48, *6, *0.85.	<0.0001.
Satisfaction Costs (Drugs, Sutures, Powers etc.)	45/5 Minimal	3/47 High	
Febrile illness	5/45	17/33	P=0.0070.

Wound healing			
Wound Complications	3/47	13/37	P=0.0122.
Hospital Stay	*9, *2, *0.28.	*14, *4, *0.57.	<0.0001.
Re-Admission.	2	5	.

Unpaired –t-test (UTT), Fisher Exact test (FET), *Mean, *SD, *SEM.

Consolidated standards of reporting trails (consort) statement

Enrollment ----------Assessed for eligibility (N= 100)
Excluded (N=0)
Not meeting inclusion criteria (N=0)
Declined to participate (N=0)
Others Reasons (N=0)

Allocation — Randomized (N=100)

Allocated to intervention (N=50)
(Gr-A-n=50-Cases)
Received allocated intervention (N=50)
Did not received allocated (N=0)

Follow up (Gr-A-n=50-Cases)
Lost to follow up (Reason, N=0)
Discontinue Intervention (Reason, N=0)

Analysis
Analyzed (N=50)
Excluded from analysis (Reason=0)

Allocated to intervention (N=50)
(Gr-n=50-Controls)
Received allocated intervention (N=50)
Did not received allocated (N=0)

(Gr-n=50-Controls)
Lost to follow up (Reason, N=0)
Discontinue Intervention (Reason, N=0)

Analyzed (N=50)
Excluded from analysis (Reason=0)

Discussion

The occurrence of pelvic hemorrhage in intra-operative, post-operative and post-partum hemorrhage as a result of unexplained undetected, unexpected and inappropriate vascular injury and its subsequent management in patients undergoing pelvic surgery may be controlled by Stepwise-pelvic devascularization (80-90%-effective but high complication and interfere future pregnancy), Compression suture including B-Lynch (85-90%-effectives but complicates Asher man, pyometra, interfered cavity), Surgical exploration and hysterectomy (90-95%-effectives but difficult, require secondary surgery, psychological and loss of fertility), s Surgical exploration with biial/bhal (66-100% and prevent 50% hysterectomy) [7] yildirim y *et al.* l, wagaazachchi pt. *et al.* nizard j *et al*. concluded that biial/bhal not compromised pelvic circulation, safe effective in life threatening hemorrhage less post-operative morbidity than hysterectomy less blood loss, less invasive, appropriate good option for moribund patients in skilled hands. It is concluded in this study that biial/bhal is not only 100% effective to control pelvic hemorrhage with preserving uterus and future fertility and zero mortality in cases (gr-a) but also minimal intra-operative, post- operative complication but also in some cases of other surgical procedures group required ultimately BIIAL/BHAL to control pelvic hemorrhage. The outcomes of individual groups in forms of primary outcome (organ damage/failure, blood loss, transfusion) secondary outcome (Early) secondary outcome (Late) tabulated and statistical significant showed better in cases (gr-a) than gr-b-controls revealed in tables. The bilateral internal iliac artery (BIIAL/BHAL) is valuable first line uterus preserving, conservative,
with less mortality and morbidity maintain future fertility, must learn and get out fear of technical consideration, clinical experiences and skill once learnt can be immense benefits to control it (time<10 minutes, collaterals 45-60 minutes) [10], inclusion in post-graduate training or orientation shown in elective cases (failure-20-30%, complication-15-63%, mortality=1%) [8].

Conclusion

This step should be adopted as prophylactic, integral and debut step effectively execute in proper time by skilled experienced the surgeons specially in better options in not only low resources area developing World where inadequate blood transfusion and modern facilities are not available and must be incorporated in G&O training. This study concluded that this is a new weapon, enriched and taught surgeons not only G&O Dep't, but also others disciplines involved radical pelvic surgery prone to pelvic hemorrhage. A plea is made-performing BIIAL/BHAL first if not done before (even if other surgical procedures done before) must accomplished it before closing the abdomen for management of pelvic hemorrhage to save life.

Disclosure of interest: the authors have no financial disclosure.

Contribution of authorship: all authors contributed to design, literature reviewed and writing of article.

Ethics approval: this is duly approved by institutional ethics committee.

Funding: no funding was used for this study and article.

Acknowledgement: thankful to institutional ethics committee and dep't of G&O.

Conflicts of interest (Coi): none.

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