

Small invasive technique of Internal Iliac Artery ligation for postpartum haemorrhage

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ABSTRACT:

Objectives: Internal Iliac artery ligation (IIAL) is an effective life-saving method to control obstetric hemorrhage, and a hysterectomy can often be avoided. A standard ligation procedure requires wide tissues dissection: incision in the peritoneum lateral to and parallel with the ureter. That can be traumatic and is difficult in practice what results in a rare use of IIAL in surgical emergency. As an alternative a novel, small invasive technique was used, which protocol is attached to the paper as a video presentation file.

Material and methods: Forty-five women treated by Internal Iliac Artery ligation for postpartum haemorrhage. In 27 patients (Cohort A) standard IIAL procedure by Kelly's method was used. In the remaining 18 patients (Cohort B) a novel, small invasive technique was performed. Time of both surgical procedures of IIAL was measured.

Results: Time of Standard technique of IIAL vs Novel small invasive technique of IIAL: 34 (26–41) min. vs 13 (8–16) min. $p < 0.001$.

Conclusions: The presented novel small invasive technique of Internal Iliac artery ligation can be an easier and safe alternative for standard ligation procedure.

Key words: postpartum hemorrhage; surgery; internal iliac artery

Ginekologia Polska 2020; 91, 1: 29–31

INTRODUCTION

Internal iliac artery ligation (IIAL) has been a valued method of treating postpartum haemorrhage saving women's fertility [1]. IIAL is an effective life-saving method to control obstetric hemorrhage, and a hysterectomy can often be avoided [2]. Even in the most catastrophic situations, rapid alternatives to hysterectomy are needed for women wishing to preserve their reproductive potential [3, 4]. It has proven that IIAL does not affect the activity of the pelvis minor's organs or fertility and that late complications seem to occur rarely [5, 6]. Complications that may occur include changes in the ovarian blood flow and the loss of ovarian reserve [7]. Kelly H. performed hypogastric artery ligation to control bleeding from pelvic cancer in 1894 [8]. In the modern era, Kelly's technique evolves, but is still considered as a standard. A standard ligation procedure requires wide tissues dissection: incision in the peritoneum lateral to and parallel with the ureter. The bifurcation of the common iliac artery needs to be located in a triangle composed by the infundibulopelvic ligament, the lateral side of the uterus and the ureter [8]. Unfortunately, that procedure can be traumatic and is difficult in practice. That

results in the rare use of IIAL in the obstetric wards. As an alternative, the manuscript present the author's own technique which can be it easier for the physicians to learn.

Objectives

Manuscript present a novel, small invasive technique of IIAL for postpartum haemorrhage, with comparison to a standard technique.

MATERIAL AND METHODS

We conducted a prospective cohort study. The study group consisted of 45 women treated by Internal Iliac Artery ligation (IIAL) for postpartum haemorrhage, due to the protocol of Royal College of Obstetricians and Gynaecologists Green-top no. 52 Guideline [9]. In 27 patients (Cohort A) standard IIAL procedure by Kelly's method [8] was used. In the remaining 18 patients (Cohort B) a novel, small invasive technique was performed by the own author's protocol, attached to this manuscript as video presentation. The description of the presented novel protocol is as follows:
1.0 Laparotomy

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- 1.1 Use the suprapubic transverse surgical incision into the abdominal cavity
- 2.0 Uterus elevation
 - 2.1 By hand, elevate an uterine Corpus
 - 2.2 Use the traction in the direction of pubic symphysis
 - 2.3 Move up the intestine from the Douglas space
- 3.0 Identification of anatomical structures of extraperitoneal space of the pelvic minor
 - 3.1 Lateral to the promontory, identify common internal artery
 - 3.2 Follow down to the bifurcation of the common iliac artery
 - 3.3 Lateral to the bifurcation of the common iliac artery find the external iliac artery
 - 3.4 Medially to the bifurcation of the common iliac artery find the internal iliac artery
 - 3.5 Across in front of the common iliac artery identify the ureter
 - 3.6 Ureter pass down posteroinferiorly on the lateral wall of the pelvis and then curve anteromedially to enter the bladder
- 4.0 Incision of peritoneum
 - 4.1 With the use of tweezers, elevate peritoneum directly above internal iliac artery 2 cm below bifurcation
 - 4.2 Cut the elevated peritoneum with scissors in a transverse direction to the artery
- 5.0 Preparation of the internal iliac artery
 - 5.1 With the use of Tupfer clean, longitudinal the anterior wall of the internal iliac artery on 2 cm long
- 6.0 Dissection of the internal iliac artery and the iliac vein
 - 6.1 With the use of blunt dissector separate artery from the vein
 - 6.2 Move the branches of the dissector forward artery bilateral to the wall of artery
 - 6.3 Avoid touching of the vein
 - 6.4 During that maneuver gently elevate the artery
 - 6.5 Repeat it until the artery is completely separated from the vein
- 7.0 Ligation of the internal iliac artery
 - 7.1 Insert absorbable suture and ligate the internal iliac artery

In order to apply a uniform surgical procedure all the surgeries were performed by the same team using a surgical protocol by Kelly [8] (Cohort A), and own author's one (Cohort B). Time of both surgical procedures of IIAL was measured. All the study participants provided written inform consent. The protocol was acknowledged by the University of Rzeszow Bioethics Committee. The analysis of the convergence of features was made by the chi-squared test. The level of $p < 0.05$ was considered statistically significant.

RESULTS

The results are shown in Table 1.

Table 1. Comparison of the time of the procedure of standard internal iliac artery ligation and the novel small invasive technique

Analysed	Number of procedures	Time of procedure (min.) [Mediana/95% CI]	P
Standard technique of IIAL	27	34 26–41	< 0.001
Novel small invasive technique of IIAL	18	13 8–16	

DISCUSSION

The effectiveness assessment of IIAL in postpartum haemorrhage treatment is high [9]. However, in practice the use of this technique in obstetrics departments is low [10]. The main reason for the rare implementation of IIAL in the treatment of postpartum haemorrhage is a rather difficult surgery technique with fear of iatrogenic damage to the iliac vessels or the ureter. The presented innovative technique, based on the preparation of the iliac arteries and ureters from access directly on the posterior-lateral wall of the pelvis minor presents an interesting alternative to the classic technique described by Kelly [8]. Especially in cases of bleeding following Cesarean sections, haematomas in parametria are quite frequent, which significantly hinders IIAL using the classic Kelly technique, even for experienced surgeons. The innovative technique presented in this article gets around this problem. Due to the lack of loose connective tissue under the peritoneum of the posterior-lateral wall of the pelvis minor, this area is almost always free from haematomas, which facilitates the identification of anatomical structures, even in difficult situations. The paper proves that presented innovative technique of IIAL allows for a significant reduction in the time of the procedure. In the examined group of 18 women who underwent surgery using the presented innovative own technique and 27 women who underwent surgery using the traditional Kelly technique, the surgeries were performed by the same surgical team. The average time of the surgical procedure after opening the abdominal cavity until occlusion of the internal iliac artery was on average 13 min. vs 34 min. ($p < 0.001$). This indirectly proves the significant simplification of the technique, which makes it easier for the physicians to learn. The weak point of this study was the small study group size, but in the presented innovative own technique of IIAL, despite from the technical simplification, the essential element is the effect of the procedure shortening. In women undergoing the IIAL procedure, usually due to substantial earlier blood loss, haemostatic disorders occur during the surgery [11]. In such cases, along with the reduction in the time of medical procedures, the chances for patients' recovery improves.

CONCLUSIONS

The presented novel small invasive technique of the Internal Iliac artery ligation can be an easier and safe alternative for standard ligation procedure.

Attachment

Video presentation file available on https://journals.viamedica.pl/ginekologia_polska

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