

## Experience from the use of absorbable type I collagen as haemostatic agent in obstetric and gynecological operations

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### Abstract

During the third stage of labour there are a lot of causes of significant hemorrhage. The commonest causes of acute hemorrhage are the uterine atony, the retained placenta, the lower tract lacerations, uterine rupture, placenta accreta, hereditary coagulopathy. Also, there could be significant bleeding, during caesarian section, usually at the time of removal of the placenta in cases of low lying placenta or placenta previa. A lot of times we have to confront serious hemorrhages in gynecological procedures like hysterectomies in cases of cervical, uterine or ovarian cancers. In order to deal with these problems successfully, general and specific measures are being taken. In cases of atonic uterus when all the other methods are unsuccessful we have to proceed to ligation of the internal iliac artery or even hysterectomy. **Material-Methods:** We have tried to use the hemostatic type I collagen in obstetrical and gynecological cases in order to control the bleeding. We have used the collagen type I totally in 8 cases. Five of them were cases of atonic uterus after normal delivery or caesarian section and three of them were gynecological cases of uterine fibroids and ovarian cancer. **Results:** By placing the collagen type I over the bleeding surfaces we have realized that in a very short period of time, there has been satisfactory control of the bleeding and immediate clinical improvement of the patient. In four out of five obstetrical cases that we have used the type I collagen, we have managed to avoid the hysterectomy. *Hippokratia 2006; 10 (4): 182-184*

**Key-words:** *Type I collagen, post partum hemorrhage, caesarian section, gynecological operations*

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### Introduction

During the last few years there has been a huge progress in the understanding of the clotting mechanisms. This has led to the introduction of new diagnostic tests. With these diagnostic methods it has become possible to make accurate diagnosis about bleeding disorders during pregnancy and labour (thrombophilia) and also to control big hemorrhages by the administration of packed cells, fresh frozen plasma, platelets or fibrinogen.

Though, it is very well known, that in order to deal with a hemorrhage due to atonic uterus general and specific measures have to be taken. General measures are the blood transfusion, the insertion of foley catheter in the bladder and the inspection under general anaesthesia, of the vagina and the cervix and maybe the digital inspection of the uterine cavity. Thus, we manage to remove any retained tissue of placenta and to exclude any uterine rupture or haematomas. On the other hand specific measures are the use of uterotonic medications, like syntocinon, ergometrine, prostaglandins and the packing of the uterus.

In cases of life threatening hemorrhage, when all

other efforts have failed, we have to proceed to the ligation of the internal iliac artery, selective arterial embolization, intrauterine packing and if these measures fail too then the last resort is the hysterectomy. So, in this kind of cases of severe hemorrhage, when all our medical measures of controlling the bleeding have been unsuccessful, we found the use of type I collagen quite satisfactory, since we have managed to control the bleeding and to prevent any possible disseminated intravascular coagulation in our patients. In all the cases of post partum hemorrhage after normal delivery or caesarian section, the use of type I collagen has prevented the hysterectomy.

### Materials and method

In all the cases of post partum hemorrhage due to atonic uterus we have packed the uterine cavity with tampon covered by hemostatic type I collagen. In cases of hemorrhage after the delivery of placenta, during caesarian section we have placed the collagen over the bleeding surface and used pressure for a few minutes with a gauze. By the same way we have controlled the

**Table 1.** *The use of collagen type I in obstetrical cases*

Age of patient (years)	Gestational age (weeks)	Infant (gr)	Mode of delivery	PPH# (mls)	Action	Transfusions (units)	Recovery (days)
35	39	live 4225	Normal delivery	1500	Intrauterine packing+ collagen I	2 PC ++, 4 F## 4 FFP**	5
34	37	live 3000	C/S* due to placenta previa	2500	Intrauterin tampon + collagen I	13 PC, 9 FFP	7
32	36	I live 2400 II live 2600	C/S due to twin pregnancy	1000	Intrauterine tampon + collagen I	No transfusion	5
28	20	IUD	C/S due to sepsis and IUD+	2000	Subtotal hysterectomy + superficial collagen I	4 PC, 5FFP, 5 Platelets	10
38	33	live 2100	C/S due to previous C/S	1800	Preassure with gauze + collagen I	4 PC	5

\* Caesarian section + Intrauterine death # Post partum hemorrhage  
++ + packed cells ## fibrinogen \*\* fresh frozen plasma

**Table 2.** *The use of collagen type I in gynaecological cases*

Age of patient (years)	Operation	Hemorrhage	Action	Transfusion (units)
50	TAH + BSO* due to fibroids	Diffuse bleeding from traumatic surfaces	Collagen I over traumatic surfaces	2 packed cells
53	TAH + BSO due to ovarian CA+	Diffuse bleeding from traumatic surfaces	Collagen I over traumatic surfaces	4 packed cells
82	TAH + BSO due to ovarian CA	Diffuse bleeding from traumatic surfaces	Collagen I over traumatic surfaces	No transfusion

+ cancer \* bilateral salpingo-ophorectomy

bleeding during gynecological procedures.

Type I collagen is a material of 96% purity and PH 5.6-6.5. It is being used in a lot of surgical procedures for hemostasis, with a great success. It has been used in orthopaedics cardiosurgery. There is no mention though in the bibliography about using it in order to control post partum hemorrhage due to atonic uterus after normal delivery or caesarian section.

The material is biologically compatible and is not causing any side- effects of hypersensitivity reactions. It is not causing any tissue necrosis and it is activating healing factors. So it is speeding up the natural process of healing and it is absorbed in 3-21 days with absolute safety.

The polypeptide type I collagen is water-soluble and is offering important proteins (19 aminoacids) including

hydroxyproline and hydroxylicine.

We have used the collagen type I totally in 8 cases. Five of them were cases of atonic uterus after normal delivery or caesarian section and three of them were gynecological cases of uterine and ovarian cancer. As seen in table I the obstetric cases were 4 caesarian sections one normal delivery with recovery between 5 to 10 days (mean 6). Case four was a referral from a prefectural hospital after a caesarian section at 20 weeks due to sepsis and intrauterine death; a subtotal hysterectomy was performed by us. All other obstetric cases had a successful outcome with live infants. The gynecological cases were all total abdominal hysterectomies and bilateral salpingo-oophorectomies, one due to fibroids and two due to ovarian cancer ( table II).

### Discussion

It is worthy mentioning that although the hemostatic type I collagen is being used in various surgical and laparoscopic procedures, there isn't any publication on its use for controlling post partum bleeding due to atonic uterus after normal delivery or caesarian section. The collagen is being already used in orthopedics, cardiosurgery, urology, gynecological operations, chest-surgery, plastic- surgery, vascular- surgery, traumatology and neurosurgery.

The type I collagen has a purity of 96% and PH 5,5-6,5. It is a very important hemostatic tool during surgical procedures 1-4. There has been a lot of research and evolution in order to be able to use it as a hemostatic agent 1, 2. It is biologically compatible and it doesn't have any side-effects or hypersensitivity reactions. It is not causing any tissue necrosis, but it is activating the healing process. It is speeding up the natural process and it is completely absorbed in 3-21 days with absolute safety. The polypeptide, water soluble type I collagen is offering important proteins (19 aminoacids), including hydroxyproline and hydroxylicine 5,6 .

The hemostatic reaction has two phases

a) during the blood absorption the collagen fibers are activating the concentration and agglutination of the platelets resulting in the initiation of the coagulation cascade. The next step is the production of fibrinogen and hemostasis.

b) In the same time, the water soluble substances of blood are producing a uniform collagen mass, which is attaching to the tissues. The quality and absorbtivity of the collagen mass is playing an important role to the production of an effective vascular thromb.

The type I collagen as it is mentioned in the bibliography, is reducing the chances of infection and

post-operative adhesions thanks to the formation of a mechanical separating gel 7-10 .

### Conclusions

Although our experience in the use of type I hemostatic collagen is limited due to the small number of patients, the successful outcome has convinced us that is a very effective hemostatic material, which can be used in cases of postpartum hemorrhage, due to atonic uterus after normal delivery of caesarian section. We have the same satisfactory results in cases of gynecological procedures. It is obvious though that a larger number of cases is needed, in order to confirm and reinforce our belief that the use of type I collagen is very effective in controlling hemorrhages due to atonic uterus and in cases of caesarian sections due to low lying placenta and placenta praevia. Also in difficult gynecological cases, where there is a significant blood loss and there is imminent disseminated intravascular coagulation the hemostatic type I collagen can be a very useful tool in our hands.

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