Material and type of suturing of perineal muscles used in episiotomy repair in Europe

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Abstract: None of the trials evaluating episiotomy repair clearly focused on perineal muscles. The aim of this study was to describe suture material and styles of suturing perineal muscles in Europe by using an email and postal questionnaire. From 34 European countries, 122 hospitals agreed to participate. Thirteen different types of sutures are currently used. The most common material is polyglactin 910 (70%) followed by polyglycolic acid. Fifty one hospitals (46%) use only short-term and 49 hospitals (44%) use only mid-term absorbable synthetic sutures. In 8 hospitals both types of sutures were used. The most common size of suture is 2-0 USP. Thirty percent of hospitals use continuous and 47% hospitals interrupted sutures for perineal muscle repair. In 23% of the hospitals there is not a uniform policy. The technique of suturing perineal muscles is diverse in Europe. It is unclear whether short-term absorbable synthetic suture should substitute mid-term absorbable synthetic material in the perineal muscle layer.

Key words: Episiotomy; Practice variation; Perineum/Surgery; Episiorrhaphy; Suture technique.

INTRODUCTION

Episiotomy, the incision of the perineum during the last part of the second stage of labour or delivery is still considered a controversial procedure. Long-term complications after episiotomy repair are common. A large proportion of women suffer short-term perineal pain and up to 20% have long-term problems (e.g. dyspareunia). Other complications involve the removal of suture material, extensive dehiscence and the need for resuturing.

According to an Italian study, episiotomy is associated with significantly lower values in pelvic floor functional tests, both in digital tests and in vaginal manometry, in comparison with women with intact perineum and first- and second-degree spontaneous perineal lacerations. In another prospective trial of 87 patients, the pelvic floor muscle strength, assessed with the aid of vaginal cones, was significantly weaker in the episiotomy subgroup compared to a subgroup with spontaneous laceration. A German study did not reveal any difference in the pelvic floor muscle strength between groups with restrictive and liberal use of episiotomy. None of these trials are specific about the type of suturing material used.

Some of the trials evaluating episiotomy and its consequence regarding suturing material, focus on the type of sutures and a technique used for suturing the superficial layers (skin or subcuticular). If mid-term absorbable polyglycolic acid sutures were used for repairing perineal muscles, a comparison to catgut (6, 9, 10) or chromic catgut (11, 12) was usually made.

One trial compared mid-term absorbable polyglycolic acid (Dexon II) with a new monofilament suture glycomer 631 (Biosyn). There were significantly more problems associated with monofilament material at 6-12 weeks postpartum (suture removal due to discomfort and pain) which might be explained by the longer absorption time of glycomer 631.

In a recent trial, in which only a short-term absorbable polyglactin 910 (Vicryl RAPIDE) is used, a continuous suture is compared to an interrupted technique and a continuous suture is found to be superior. To our knowledge, three trials have compared short- and mid-term synthetic absorbable suturing material. In these, either only a standard mid-term absorbable polyglactin 910 (Covered Vicryl) or only a short-term absorbable polyglactin 910 (Vicryl RAPIDE) was used for all layers (vaginal mucosa, perineal muscles, subcuticular/skin). All of them focused on perineal pain and short-term complications of the repair and did not follow the pelvic floor muscle function. A small Danish randomized control trial (RCT) showed no difference in short- and long-term perineal pain, with a reduction in pain when walking on day 14 in a Vicryl RAPIDE group. Also, no difference was found between groups regarding episiotomy dehiscence.

An Ulster study compared the same materials (Coated Vicryl and Vicryl RAPIDE). 1678 women were completed after birth with Coated Vicryl and 75 with Vicryl RAPIDE. At six and twelve weeks, a significant difference in the rates of wound problems (infection, gaping, pain, material removed) was found in favor of Vicryl RAPIDE. Kettle et al. performed a very well designed RCT with 1542 women. These were randomized into groups where either a standard mid-term absorbable polyglactin 910 (coated Vicryl) or a short-term absorbable polyglactin 910 (Vicryl RAPIDE) was used. The sutures of the perineal muscles and the skin were either, only interrupted, or only continuous, non-locking. The vaginal mucosa was always sutured continuously. This trial shows a clear benefit of the continuous technique compared to the interrupted. The pain at day 2, 10 and onwards up to 12 months postpartum was significantly lower in the continuous group. Also, all the other followed parameters (suture removal, uncomfortability, tightness, wound gaping, satisfaction with the repair and a return to normality within 3 months) were in favor of the continuous technique.

Comparing the standard mid-term absorbable and short-term absorbable polyglactin 910, in the parameter which differed most (suture removal), if sutures needed to be removed only visible transcutaneous sutures were removed from the continuous group. So the rate for suture removal, which was significantly lower for those who had received short-term absorbable polyglactin 910, is related to vaginal mucosa or skin and not to the sutures of perineal muscles. Pain at day 10 was not significantly different; however, some secondary pain measures (pain walking) were significant. The reduction in pain is achieved by inserting the skin sutures into the subcutaneous tissue and so avoiding nerve endings in the skin surface. So the difference at day 10 might be explained by a different rate of absorption between Vicryl RAPIDE and Coated Vicryl and irritating nerve endings in the skin (and not in the muscles) by the remaining Coated Vicryl sutures. Vicryl RAPIDE is...
absorbed in 42 days and its tensile strength is none (0 lb from original 10 lb) after two weeks. The suture begins to fall off in just 7 to 10 days. So this is ideal material if no wound tension after 7-10 days is acceptable. Coated Vicryl is absorbed in 56-70 days and its tensile strength is at 75% (10 lb from original 14 lb) after two weeks.19

No study has been clearly focused on the layer of perineal muscles. No study has as yet explored the advantage of new sutures with antibacterial properties for suturing the perineal muscles.

DeLancey and Hurd show that urogenital hiatus is sealed by the vaginal walls, endopelvic fascia, and urethra. Once the urogenital hiatus has opened up, the vaginal wall and cervix lie unsupported. The constant vector of abdominal pressure on the fascia can cause its failure. It is ultimately the perineal body that is the mechanism for preventing prolapse beyond the urogenital hiatus.20

The layers traversed during uncomplicated mediolateral episiotomy are: epithelium, bulb of vestibule, Bartholin’s gland (occasionally), bulbospongiosus, superficial transverse perinei, perineal membrane, urethrovaginal sphincter and transversus vaginae.21 Puborectalis muscle is rarely ever involved in this incision and so not affected by this procedure. When repairing an episiotomy, the suture of perineal muscles seems to be the crucial step for an obstetrician or midwife in preventing a decrease in the pelvic floor muscle strength.

The aim of this survey was to map the current situation in Europe and to describe common types of material and styles of suturing perineal muscles after episiotomy in European hospitals.

MATERIALS AND METHODS

In the year 2006, an email or postage questionnaire study was sent to different European hospitals. The question related to this project was as follows:

Which type of material and methods of suturing are used in your hospital for perineal muscles?

Hospitals of 27 EU countries, of 3 countries which had initiated entrance talks to the EU, plus Iceland, Israel, Norway and Switzerland, were asked to answer a mediolateral episiotomy questionnaire.

RESULTS

A total of 122 hospitals in 34 European countries participated in this project and sent back their answers. Sixty eight hospitals are from countries which entered the EU later or hospitals are situated in the original 15 EU countries, 44 hospitals are from countries which entered the EU later or are involved in entrance talks, and 10 hospitals are located in the four remaining countries: Iceland, Israel, Norway and Switzerland.

Type of suturing material

A total of 110 hospitals reported that one type of suture material is used for perineal muscle repair while 12 hospitals answered that they use alternatively two types of sutures. None of the hospitals uses more than two different sutures in their standard approach.

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Altogether 13 different types of sutures are currently in use across Europe. These are shown in Table 1.

<table>
<thead>
<tr>
<th>Material</th>
<th>(N)</th>
<th>Mention (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Catgut</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>2. Chromic catgut</td>
<td>5</td>
<td>3.5</td>
</tr>
<tr>
<td>3. Dexon II</td>
<td>5</td>
<td>3.5</td>
</tr>
<tr>
<td>4. Safil</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>5. Safil Quick</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>6. Coated Vicryl</td>
<td>40</td>
<td>29.5</td>
</tr>
<tr>
<td>7. Vicryl RAPIDE</td>
<td>55</td>
<td>41</td>
</tr>
<tr>
<td>8. Vicryl PLUS Antibacterial</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9. Monocryl</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10. Chirlac rapid braided</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>11. Assucryl synthetic</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12. Polysorb</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>13. Ethilon</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>14. Not exactly specified absorbable material</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Total: 134 hospitals

NB.: The total number amounts to 134 (12 hospitals use two materials alternatively).

 matures alternatively.

institution that also uses some other absorbable material. Catgut and/or chromic catgut are used as the only suture in 11 institutions (9%).

Considering short- and mid-term absorbable synthetic sutures, we found that short-term absorbable sutures (Safil Quick, Vicryl RAPIDE, Chirlac rapid braided) are used by 61 hospitals (50%). Mid-term absorbable sutures (Dexon II, Safil, Coated Vicryl, Vicryl PLUS Antibacterial, Assucryl synthetic, Polysorb) are used for suturing the perineal muscles in 55 hospitals (46%). Monocryl, whose absorption time is somewhere between short- and mid-term is used by one hospital. Only one hospital reported using a new absorbable synthetic suture with Triclosan (Vicryl PLUS Antibacterial), that has antibacterial properties.

Fifty one hospitals (46%) use only short-term absorbable synthetic sutures and 49 (44%) use only mid-term absorbable sutures for perineal muscle repair. In 8 hospitals (8%) both types of sutures were used and 3 hospitals (2%) were not specific about their absorbable material.

Size of the suturing material

As for sizes of the sutures, we received 96 answers of which 3 hospitals referred to two alternative sizes. In 26 remaining responses (8 using catgut only) the hospitals did not give details regarding the size of sutures used for perineal muscle repair.

Among the hospitals which use only one type of material and only one size, the most frequent response was 0-0 Vicryl RAPIDE - 32 cases, followed by 0 and 2-0 Coated Vicryl, both reported by 13 institutions. All details are shown in Table 2.

Method of suturing of perineal muscles

In the catgut group 5 hospitals did not answer. From the remaining 6 hospitals, only one hospital uses both techniques (continuous or interrupted), and a remaining 5 hospitals suture perineal muscles with interrupted stitches only.

From 111 hospitals which use an absorbable synthetic material for suturing the muscles, 89 hospitals answered in full with 27 (30%) hospitals use continuous sutures, and 42 (47%) hospitals interrupted sutures. Twenty (25%) hospi-
tals do not have a uniform policy and leave the method of suturing to the discretion of the individual doctors (or midwives).

**DISCUSSION**

The choice of the suture depends on: properties of suture material, absorption rate, handling characteristics and knotting properties, size of suture, and the type of needle.

Nearly a half of all European hospitals cooperating in this project use a mid-term synthetic absorbable suture for the suturing of perineal muscles. The other question put to participants in this questionnaire was analyzed in another article. In order to keep the question simple, there was not an additional request, if the same mid-term absorbable synthetic suture is used for all layers or for perineal muscles only. The majority of hospitals use interrupted sutures to approximate perineal muscles; the latter possibility is not excluded.

It was also noted that a new synthetic material with antibacterial properties (Vicryl PLUS Antibacterial) is currently used by one institution.

According to the meta-analysis, mid-term absorbable synthetic material for perineal repair is associated with less short-term pain compared to traditional gut sutures but with increased rates of removal. Further research with alternative suture materials is needed. This disadvantage is reduced with short-term synthetic material and with a subeuticular continuous non-locking technique of episiotomy repair. However, the information regarding suturing material of perineal muscles is not extensive. There is a recommendation that a short-term synthetic absorbable suture (Vicryl RAPIDE) is a preferential material for all three layers in an episiotomy repair and so episiotomy absorbable suture is used for all layers or for perineal muscles only. The majority of hospitals use interrupted sutures to approximate perineal muscles; the latter possibility is not excluded.

However, according to Ethicon Sutures Homepage, a short-term absorbable suture (Vicryl RAPIDE) is suggested for superficial closure of mucosa or skin closure for patients not returning for another check-up. A mid-term absorbable suture (Coated Vicryl) should be used for general tissue and muscle approximation. A new mid-term absorbable suture (Vicryl PLUS Antibacterial) has the same indication as Coated Vicryl and should be used when extra caution is desired (i.e. potentially high risk surgical sites). More information is needed to find the potential benefit of Tri-closan in perineal repair.

On the other hand the Aesculap web page recommends a short-term absorbable suture (Safil Quick) for an episiotomy repair in Gynaecology and Obstetrics without further specification.

In the review of the management of obstetric sphincter injury, great care should be exercised in reconstructing the perineal muscles to provide support to the sphincter repair. Muscles of the perineal body should be reconstructed with Vicryl 2-0 sutures. It might happen that a short-term absorbable synthetic suture does not necessarily hold the approximated torn muscles for a sufficient time. However this assumption is not based on any evidence.

There is a consensus that a short-term absorbable synthetic suture is the best choice for vaginal mucosa and perineal skin. The suturing the mucosa and perineal skin with a short-term absorbable synthetic suture and perineal muscles with a mid-term absorbable synthetic suture would bring additional expenditures for any institutional budget. The production of a prefabricated episiotomy set, where both sutures would be available, could reduce this increase in costs. An episiotomy set already exists in several hospitals. Also, in this era of reducing adjacent episiotomies, this additional expenditure would not be so dramatic compared to the financial implications of anal sphincter repair.

Currently, the type of material, its size and the technique of suture is not a controversial topic regarding vaginal mucosa and perineal skin. However, the style of suturing of perineal muscles has not yet been fully explored. This European survey serves to document this ambiguity. Further well designed RCTs are required to focus on the real role of the perineal muscles after vaginal birth and the best method of their repair. These RCTs must also comprise the exact depiction of cutting of episiotomy and all details with regards to the repair.

This survey shows that there is much diversity in the technique of suturing of perineal muscles across Europe. It is not clear enough if short-term absorbable synthetic suture should substitute mid-term absorbable synthetic material in this layer, as it did for vaginal mucosa and perineal skin.

On the basis of information obtained from 122 European hospitals, the authors of this survey would like to cooperate in a multicentric trial to obtain more information.

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Complication rates of tension-free midurethral slings in the treatment of female stress urinary incontinence: a systematic review and meta-analysis of randomized controlled trials comparing tension-free midurethral tapes to other surgical procedures. Novara G, Galfano A, Boscolo-Berto R, Secco S, Cavalieri S, Ficarra V, Artibani W. Eur Urol. 2007 Nov 8; epub. To evaluate the complication rates of tension-free midurethral slings compared with other surgical treatments for stress urinary incontinence a systematic review of the literature using MEDLINE, EMBASE, and Web of Science identified 33 randomized controlled trials reporting data on complication rates. Tension-free slings were followed by lower risk of reoperation compared with Burch colposuspension, whereas subpubovaginal sling and tension-free midurethral slings had similar complication rates. With regards to tension-free tapes, voiding LUTs and reoperations were more common after SPARC, whereas bladder perforations, pelvic haematomata, and storage LUTS were less common after transobturator tapes. The quality of many evaluated studies was limited.

Pelvic Floor Digest

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