The use of polyglycolic acid sutures in obstetrics and gynecology

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Dexon® (Davis & Geck, American Cyanamid Company) polyglycolic acid (PGA) suture is a nontoxic, noncollagenous, absorbable suture that is claimed to have several advantages over catgut and at the same time to possess many of the desirable features of a nonabsorbable suture. This suture differs significantly from others that are available in that it is composed of a synthetic polymeric fibre (technically a polyester) having the unique property of predictable, progressive absorption. The tensile strength, handling properties, minimal tissue response, and knot security equal or surpass those of catgut and certain nonabsorbables such as silk, Dacron® (E.I. duPont de Nemours & Co.) and nylon. The PGA suture is extremely strong and easy to handle, and has excellent non-slip properties. Our clinical experience with this new synthetic, absorbable suture is presented in this paper.

Materials and methods

One hundred and two patients were evaluated following gynecological operations (52) or obstetrical episiotomy repairs (50).

The patients who had been subjected to gynecological procedures were divided into two equal groups. In one group PGA sutures were used; the second group served as controls, their wounds being closed with sutures of chromic catgut, silk, or Mersilene® (Ethicon, Inc.). These two groups were matched as regards patient age and surgical procedure (Table I). The gauges of the PGA sutures used were 0 for tissues (with one exception), 000 in the skin, and 00 for ligatures. The sutures in the control group included chromic catgut no. 1 for tissues and ligatures, and silk 00 and Mersilene® 00 in the skin.

The second part of the study was of 50 obstetrical patients requiring repair of episiotomy. Twenty-five incisions were closed with PGA-000 and 25 with chromic catgut 000. Subcuticular stitching was used in both groups.

The degree of comfort of the patients was inquired into throughout the time they were in hospital. Six to eight weeks postoperatively or post partum they were examined for the presence of granulation tissue.

Results

Obstetrical patients: The nurses observed that the PGA group appeared more comfortable and complained less during the first week of the puerperium. All episiotomy incisions healed by primary intention and there was no formation of granulation tissue. One patient in the control group, at the sixth week, showed an area of scarring as if a piece of catgut had been rejected. No side reactions were observed with PGA.

Gynecological patients: With postoperative morbidity defined as a temperature of 38°C. for two or more days during the first 10 days postoperatively (excluding the first 24 hours), the following observations were made:

Of the patients in whom PGA sutures were used, the postoperative course was uneventful in 22. Four of the 26 patients developed postoperative morbidity unrelated to the suture material (Table II). In 14 of the control patients the postoperative course was uneventful. Of the remaining 12 patients, eight had postoperative morbidity unrelated to the suture material; one had chest pain and hypertension, one developed an allergic reaction to adhesive tape, one died from carcinomatosis, and the only condition attributable to the suture was an incisional breakdown in one patient (Table III).

All 26. operational sites sutured with PGA had completely healed in six to eight weeks. Four of the patients developed small central areas of granulation tissue — three at the vaginal vault and one in the abdominal incision. In the control group, 25 of the 26 operational sites were completely healed at six weeks; one patient continued to reject pieces of catgut from the abdominal incision throughout the six-week postoperative period. Four patients

Table I
Operations performed

Procedure	PGA suture	Control suture
Abdominal hysterectomy	10	10
Vaginal hysterectomy	7	11
Anterior repair	3	0
Anterior-posterior repair	1	2
Enterocele repair	4	1
Laparotomy	1	1
Radical vulvectomy	0	1
TOTAL	26	26

Table II
Postoperative morbidity in patients with PGA sutures

Postoperative course
1. Fever unrelated to suture
2. Low grade fever unrelated to suture
3. Vault hematoma
4. Pulmonary infection

Table III
Postoperative morbidity in patients with control sutures

1. Vault hematoma
2. Fever—two days
3. Chest pain, hypertensive
4. Genito-urinary infection
5. Allergy to adhesive tape
6. Febrile episode (antibiotics used)
7. Febrile course for two days
8. Vault hematoma
9. Genito-urinary infection
10. Urinary tract infection
11. Carcinomatosis; died on tenth postoperative day
12. Incisional breakdown

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sutured with chromic catgut developed granulation tissue at the vaginal vault; in one of these cauterization of the granulations on three different occasions was required. One patient in the control group developed a ventral hernia.

Comments

The ideal suture material should exhibit the following properties: exceptional handling characteristics, minimal tissue reaction, ultimate absorbability, excellent tensile strength, consistent knot security, and a potential use in a variety of surgical procedures. Polyglycolic acid appears to be such a material, retaining most of the desirable characteristics of the synthetic nonabsorbable sutures and having the additional property of eventual absorption.[1] The PGA material compares favourably with catgut but has the added advantages of superior strength,[2, 3] easier handling,[4] and better toleration.[4-6]

In our study, PGA sutures caused minimal tissue reaction and were satisfactorily absorbed in both gynecological and obstetrical use. The presence of granulation tissue was the same in both the PGA and control groups and could possibly be attributed to vaginal surgery *per se*, since seven of the eight areas were in the vaginal vault. The number of occurrences and the degree of development vary with the experience and skill of the surgeon.

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REVIEW ARTICLE

Inborn errors of metabolism: principles and their applications

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Purpose: The preparation of this review was motivated by the unrelenting progress being made in the area of inborn errors of metabolism. Its purpose is to present a simple but inclusive survey of the principles underlying these disorders of man and their growing number of clinical applications.

Definition: An inborn error of metabolism is a disorder resulting from the gene-determined alteration of an intracellular biochemical activity usually responsible for one step in the synthesis, degradation, transformation, or detoxification of a single chemical substance or of a group of related ones.

The word "intracellular" is included in order to exclude those inherited biochemical disorders resulting from disturbances of cell membrane transport, or of intraluminal intestinal digestion. Also excluded are those inherited diseases resulting from abnormalities in the synthesis of proteins such as hemoglobin, the clotting factors and some hormones. Thus, the definition offered includes those disorders in which the primary consequence of mutant gene action is on intracellular metabolism, and excludes those in which the metabolic consequences of the mutation are remote from the mutation's primary action.

As thus defined, in almost all inborn errors of metabolism the altered biochemical activity is a deficient enzyme activity. Inborn errors stemming from mutations causing increased enzyme activity appear to be very uncommon; acute intermittent porphyria is one possible example.

Genetics: Essentially all the inborn errors of metabolism are caused by autosomal or X-linked recessive genes. In the first case, a double dose (homozygosity) of the mutation affects males and females equally. In the second case, a single dose of the mutation causes disease in males (hemizygosity), while heterozygous females act as the carriers.

Principles of the inborn errors of metabolism

A. *Chronologic types:* The term "inborn" implies that the error of metabolism is operative from conception and throughout the life of the individual. This assumption is not always valid (Fig. 1). One clear exception is provided by those enzyme activities that normally do not appear until the perinatal period. Clearly, the metabolic lesion asso-

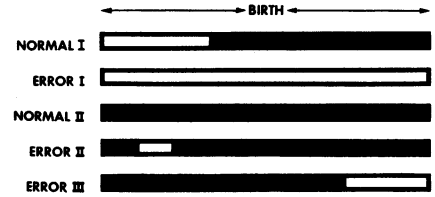

FIG. 1—Chronologic types of inborn errors of metabolism: ■, enzyme present; □ enzyme absent.

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