Letters and Comments

Reevaluation of Single-Use Insulin Syringes

The medical literature indicates that reuse of insulin syringes is a safe, cost-effective procedure, and various methods are suggested for storing syringes between uses (1–11). This study assessed four of these methods in relation to the incidence of skin infections at injection sites and compared these with the evidence of infection when a syringe is discarded after a single use.

Twenty-five patients (aged 31–64 yr, mean 53) who had had diabetes mellitus from 2 to 40 yr (mean 17.1 yr; 9 IDDM, 16 NIDDM) and had been taking insulin 5 mo to 40 yr (mean 13.2 yr) participated in the study. All patients were taking two injections per day: 9 NPH only, 1 Lente only, 11 NPH and Regular, and 4 Lente and Regular. Lilly Humulin (Indianapolis, IN) or Nordisk human insulin was used with U100 (Becton Dickinson, Rutherford, NJ) insulin syringes.

Each patient used each of the methods listed below, changing the method every 12 days. To control for bias, the method the patient started with and the order in which the other methods followed were randomly assigned. Patients were instructed to administer their insulin in the usual way; correct technique was confirmed by the investigators.

Method A. After each injection, wipe needle with alcohol swab, cap it, and put syringe in refrigerator. Use same syringe for 4 injections.
Method B. After each injection, wipe needle with alcohol swab, cap it, and keep syringe at room temperature. Use same syringe for 4 injections.
Method C. After each injection, put cap on needle, then refrigerate. Use same syringe for 4 injections.
Method D. After each injection, put cap on needle, then keep at room temperature. Use same syringe for 4 injections.
Method E. After each injection, discard syringe.

The patient recorded the date, time, and site of each injection for each method on a form. If any redness, swelling, warmth, or tenderness at an injection site was observed within 72 h, the patient was instructed to call the diabetes nurse or designee, who would arrange for the patient to see one of the diabetic clinic physicians. The patient's record of injections was returned by mail to the investigators of the study. Although this might be viewed as a limitation, needles, syringes, insulin, and injection sites were not cultured; other studies had already demonstrated lack of significant (i.e., potentially infection-causing) growth of normal skin flora or pathogens in cultures from these contact points (2–4,7,9). In this study, injection sites would only be cultured if a draining skin infection developed and a culture was ordered by the physician.

Two thousand nine hundred ninety-five injections were accomplished. No patients called to report or recorded concern about infection or inflammation at any injection site. Analysis of variance confirmed there were no differences in the number of skin infections among four methods for storing insulin syringes between multiple uses or in comparison with the number of infections when syringes were discarded after a single use.

Although the population was small for our study, it confirms the observations of other invesigators; reuse of insulin syringes is a safe, cost-effective option for insulin-taking diabetic individuals. Further investigation with a larger population reusing syringes for longer periods should be done to determine if syringes can be used more than four times without pathogenic bacterial colonization of syringes, insulin, or injection sites.

As health-care professionals, we should continue to encourage cleanliness for the insulin injection technique and caution against use of altered or damaged insulin or syringes. We could explain the methods that have been tested and let the patient elect to discard the syringe after a single use or select the reuse method the patient finds easiest.

JOYCE A. McCARTHY, RN, MS, CDE
PAUL F. SINK, JR., RN, BSN, MA
BETTY M. COVARRUBIAS, RN, BSN

From the James A. Haley Veterans' Hospital, Tampa, Florida.
Address correspondence and reprint requests to Joyce A. McCarthy, James A. Haley Veterans' Hospital, 13000 Bruce B. Downs Boulevard, Tampa, FL 33612.

REFERENCES

1. Allen SC: Insulin treatment in developing countries. *Lancet* 2:174, 1983
2. Aziz S: Recurrent use of disposable syringe-needle units in diabetic children. *Diabetes Care* 7:118–20, 1984
3. Borders LM, Bingham PR, Riddle MC: Traditional insulin-use practices and the incidence of bacterial contamination and infection. *Diabetes Care* 7:121–27, 1984
4. Collins BJ, Spence BK, Richardson SG, Hunger J, Nelson JK: Safety of reusing disposable plastic insulin syringes. *Lancet* 1:559–60, 1983
5. Crouch M, Jones A, Kleinbeck E, Reece E, Bessman AN: Reuse of disposable syringe-needle units in the diabetic patient. *Diabetes Care* 2:418–20, 1979
6. Greenough A, Cockcroft PM, Bloom A: Disposable syringes for insulin injection. *Br Med J* 1:1467–68, 1979
7. Hodge RH, Krongard L, Sande MA, Kaiser DL: Multiple use of disposable insulin syringe-needle units. *JAMA* 244:418–20, 1980
8. Oli JM, Gugnani HC, Ojiegbe SC: Multiple use of ordinary disposable syringes for insulin injections. *Br Med J* 284:236, 1982
9. Schade DS, Eaton RP: Bactericidal properties of commercial U.S.P. formulated insulin. *Diabetes* 31:36–39, 1982
10. Strathclyde Diabetic Group: Disposable or nondisposable syringes and needles for diabetics. *Br Med J* 286:369–70, 1983
11. Turner JG, Lancaster J: Multiple use of disposable syringe units by insulin-dependent diabetics. *Diabetes Educ* 10:38–41, 1984

Vomiting During OGTT in Third Trimester of Pregnancy

In the United States the normal values for oral glucose tolerance tests (OGTT) in pregnancy are derived from the response to 100 g of glucose given orally (1,2). The suitability of the original O'Sullivan and Mahan (1) data has been criticized because of *1*) differences in measurement of blood glucose (O'Sullivan and Mahan measured whole-blood glucose by the Somogyi-Nelson method; with current methodology, plasma glucose is measured by enzymatic methods; 3); *2*) variable time during gestation of testing; and *3*) the contention that too many pregnant women vomit after a 100-g glucose dose (4). The concern about the prevalence of vomiting after 100-g OGTT is one reason for studies of oral glucose tolerance during pregnancy with 50-g (5) and 75-g (4) glucose doses. We describe our experience with vomiting during the 100-g OGTT in the third trimester of pregnancy.

All pregnant women studied had failed a 50-g OGTT, plasma glucose ≥140 mg/dl 1 h later. The OGTT was performed with 100 g of glucose in 300 mg/dl (Coldex, Ferndale, MI) after chilling the liquid overnight. The women were ambulatory and attended the clinic after an overnight 12-h fast; they were instructed not to smoke and to be seated during the test. The test was identified as affected if the nausea or vomiting after 100 g of glucose orally was sufficient to abort the test.

We performed 317 OGTTs between 1984 and 1988. The OGTT was stopped 14 times because of vomiting for a prevalence of 4%. One patient vomited 3 times in response to a 100-g oral glucose dose.

The 100-g glucose dose in pregnancy must occasionally (4%) be stopped because of vomiting, but the low prevalence of vomiting does not support the contention that the 100-g OGTT in pregnancy should be changed to 50 or 75 g because of vomiting (4). The few women who do not tolerate the 100-g glucose dose should be evaluated further with assays for glycosylated hemoglobin and a repeat OGTT with a 50-g (5) or 75-g (4) glucose dose.

J. DAVID FACHNIE, MD
FRED W. WHITEHOUSE, MD
ZOE McGRATH, RN

From the Division of Metabolic Diseases, Henry Ford Hospital, Detroit, Michigan.
Address correspondence and reprint requests to Dr. J. David Fachnie, the Division of Metabolic Diseases, Henry Ford Hospital, 2799 W. Grand Boulevard, Detroit, MI 48202.

REFERENCES

1. O'Sullivan JB, Mahan C: Criteria for the oral glucose tolerance test in pregnancy. *Diabetes* 13:278–85, 1964
2. Freinkel N, Hadden D: Summary and recommendations of the second international workshop-conference on gestational diabetes mellitus. *Diabetes* 34 (Suppl. 2):123–26, 1985
3. Schwartz ML, Brenner WE: The need for adequate and consistent diagnostic classifications for diabetes mellitus diagnosed during pregnancy. *Am J Obstet Gynecol* 143:119–24, 1984
4. Hatem M, Anthony F, Hogston P, Rowe DJF, Dennis KJ: Reference values for 75 g glucose tolerance test in pregnancy. *Br Med J* 296:676–78, 1988
5. Abell DA, Beischer NA: Evaluation of the three-hour oral glucose tolerance test in detection of significant hyperglycemia and hypoglycemia in pregnancy. *Diabetes* 24:874–80, 1975