

# Needle and Catheter Colonization in Pregnant Diabetic Patients Using the Continuous Subcutaneous Insulin Infusion Pump

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The incidence of bacterial colonization and risk of infection associated with the use of continuous insulin infusion pump (CIIP) was examined in 11 pregnant diabetic patients. All patients received instruction on specific aspects of CIIP and needle insertion technique according to the protocol used in our institution. A total of 220 cultures was performed on the subcutaneous needle and connective tubing. There was no clinical evidence of infection. In conclusion, the risk of infectious cutaneous complications in the pregnant diabetic patient using CIIP is not increased over the nonpregnant diabetic population. *DIABETES CARE* 7: 75-76, JANUARY-FEBRUARY 1984.

The incidence of significant cutaneous infections in diabetic patients is between 15% and 25% annually.<sup>1</sup> The most common causative organisms are *Staphylococcus aureus* or *Enterobacteriaceae*.<sup>2,3</sup> Recent technologic advances to better control glucose levels in the diabetic patients, such as the continuous insulin infusion pump (CIIP) with the use of an indwelling needle and catheter in the subcutaneous tissue to deliver insulin, pose the potential risk of serious infectious complications. The purpose of this report is to examine the incidence of bacterial colonization and risk of infection associated with the use of CIIP in pregnancy.

## MATERIALS AND METHODS

Eleven insulin-dependent pregnant diabetic patients were managed using CIIP over a 13-mo period. Patients and family members received standard instruction in diabetes self-care and home blood glucose monitoring. The attending physician and perinatal nurse also instructed each patient individually in specific aspects of CIIP and needle insertion techniques. The following protocol was used in our unit.

Before insertion of the needle, the skin was prepared by scrubbing with 70% isopropyl alcohol and allowed to dry. Providine iodine solution was then applied, if the patient was not allergic to iodine, and allowed to dry before needle insertion. The indwelling needle and connecting tubing were changed every 48 h. The needle and connecting tubing were removed after the skin surrounding the puncture area was prepared by scrubbing with 70% isopropyl alcohol and allowed to dry. Before the needle was withdrawn, four dry

sterile gauze pads were placed around the insertion site protecting the needle from undue contact with the skin. The needle was then placed in trypticase soy broth and transported to the bacteriology laboratory where cultures were performed. The connecting tubing was cultured by sampling the lumen with a sterile Q-tip. The specimens were transferred aseptically into chopped meat glucose broth and blood chocolate agar plates.

## RESULTS

A total of 220 cultures were performed in 11 patients during the first 3 wk of therapy with CIIP. Bacteria were isolated from 6 of the 110 needles that were cultured. The overall incidence of colonization was 5%. All positive cultures grew *Staphylococcus epidermidis*. The connective tubing cultures were negative. There were no signs of inflammation, presence of purulent discharge, erythema, induration, or tenderness at the site of the subcutaneous injection and no abscess formation was encountered in any patients.

## DISCUSSION

CIIP and home glucose monitoring are accepted modes of therapy for achieving improvement in the control of blood glucose levels in the diabetic patient.<sup>4,5</sup> However, neither one is without complications and/or certain disadvantages. Significant reported complications associated with CIIP include hypoglycemia, equipment failure, and cutaneous complications.<sup>4,5</sup> Hypoglycemia poses the biggest risk, but fortunately was encountered in only two patients in our study

group. Equipment failure has been minimized with the newer generations of CIIP.<sup>4</sup> Alarm systems are built in the pumps to reduce the amount of unnoticed pump runaways, low battery power, and catheter or needle occlusions or disconnections.

The most severe cutaneous complication has been abscess formation at the site of insulin infusion. These abscesses have usually resulted from poor hygiene.<sup>6</sup> Small lumps at the site of insulin infusion are another type of skin lesion seen frequently in patients using CIIP. Although the etiology of this lesion is unknown, it appears to be related to the duration of needle implantation. Frequent changing of the infusion site decreases the frequency of the occurrence of these lesions. Purified insulin preparations decrease the occurrence of these lumps.<sup>6</sup>

No significant complications associated with home blood glucose monitoring have been reported. Infection at the site of blood letting has not been a problem to date.<sup>7,8</sup> The only disadvantage associated with this method is pain from the finger stick.

#### SUMMARY

**E**ven though this study is small in number of patients, we can say that in the pregnant diabetic patient the risk of infectious cutaneous complications using CIIP is not increased over the nonpregnant diabetic population. Investigators disagree as to the increased susceptibility to skin infections in diabetes. But once an infection is established, it is accepted that it will be more severe and refractory to treatment in the diabetic patient.<sup>1,3</sup> In conclusion, with good patient training and compliance, as well as trained personnel surveillance, infectious complications with

the use of CIIP may be reduced to a minimum. The importance of constant observation and adherence to established protocols in the use of new technological advances is essential.

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