Cohort Study

HbA1c is Associated with Hyperglycemia After Local Dexamethasone Injection in Diabetes Mellitus Patients: A Cohort Study

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Background: Glucocorticoids (GCs) are often administered locally to inhibit the synthesis and release of pro-inflammatory cytokines, thereby alleviating local pain. While GCs are known to exacerbate hyperglycemia, we previously reported changes in glucose levels following a single-dose dexamethasone injection in patients who did not have diabetes mellitus (DM). In patients without DM, blood glucose levels increased on the first day but were generally not critical. However, the exact changes in blood glucose levels due to GCs and the risk factors for blood glucose elevation in DM patients remain unclear.

Objectives: To measure changes in glucose levels following a single-dose dexamethasone injection in patients with DM and identify the risk factors for hyperglycemia.

Study Design: Cohort study.

Setting: Gifu University Hospital, Japan.

Method: Fifty DM patients undergoing elective pulsed radiofrequency of the lumbar or sacral nerve root or radiofrequency of the lumbar medial branch of the posterior primary ramus were analyzed. Each patient received 0.1 mg/kg of dexamethasone and was subjected to interstitial glucose monitoring using a continuous glucose monitoring system. Hyperglycemia was defined as a blood glucose level ≥ 200 mg/dL. The area under the curve (AUC) for glucose levels ≥ 200 mg/dL was calculated. Risk factors for hyperglycemia were analyzed using an ordinal regression model, with AUC as the objective variable and 4 factors (glycosylated hemoglobin [HbA1c], age, body mass index, and pre-procedure glucose levels) as explanatory variables. Nonlinear regression models were used to predict the blood glucose trends.

Results: Blood glucose levels increased immediately after the dexamethasone injections. The median (interquartile range) maximum glucose level was 328 (250-386) mg/dL, with a median time to peak of 592 (400-700) min. Among the 4 factors, age and HbA1c level were significant predictors of hyperglycemia ($P = 0.035$ and 0.023, respectively). Patients treated with insulin were predicted to have significantly higher blood glucose levels than those treated for DM with non-insulin medications or no pharmacological medications ($P < 0.001$).

Limitations: Firstly, GCs are metabolized by cytochrome p450 3A4, and medications that affect this pathway may alter the clearance of GCs. Some of our patients were taking medications that influenced the cytochrome pathway. Secondly, preoperative insulin management details (dosing, timing, and types) were not fully documented. Thirdly, stress-induced hyperglycemia could not be ruled out. Finally, patients' meal timing and caloric intake were not recorded.

Conclusion: Patients with DM experienced significant hyperglycemia even after a single dose of dexamethasone. Age and HbA1c levels were risk factors for hyperglycemia. Higher preprocedural HbA1c levels, reflecting poorer daily glucose control, were associated with increased blood glucose levels.

Key words: diabetes mellitus medication, diabetes mellitus patients, glucocorticoids, glycosylated hemoglobin, hyperglycemia, insulin, nerve blockade

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Glucocorticoids (GCs) are commonly administered locally to inhibit the synthesis and release of pro-inflammatory cytokines, thereby reducing localized pain. Although long-term GC use is associated with side effects, such as poor wound healing, osteoporosis, cardiovascular complications, hyperglycemia, and diabetes mellitus (DM) (1), it is considered rare for serious side effects or complications to follow single-dose GC administration (2). However, even a single dose can lead to pharmacological complications, including hypothalamic-pituitary axis suppression, blood glucose elevation, increased blood pressure, and fluid retention (2). These systemic effects, including hyperglycemia, may also occur in locally injected GCs (3,4).

Hyperglycemia can cause such symptoms as polyurea, polydipsia, weakness, nausea, vomiting, and dehydration. Severe cases may lead to life-threatening complications such as ketoacidosis and hyperosmolar hyperglycemic states (5). The exact mechanisms by which GCs affect glucose homeostasis remains unclear. GCs elevate blood glucose levels by suppressing glucose-stimulated insulin secretion, inhibiting insulin action in the liver, and reducing glucose clearance (6,7).

Even in patients without DM, postprandial blood glucose levels have been reported to increase the day after multiple cortivazol injections into the epidural or shoulder regions (8). We previously measured the continuous changes in glucose levels after a single-dose dexamethasone injection in non-DM patients and found that the blood glucose levels were higher on the first day than usual following a local injection, although not critically so in most cases (9). However, GCs are known to precipitate hyperglycemic crises in DM patients (10). Studies have reported that significant fasting and postprandial blood glucose levels increase for up to 3 days after epidural triamcinolone injections (11) and elevated fasting glucose levels for 2 days after methylprednisolone acetate injections into the hand and wrist (12). In a clinical review that evaluated blood glucose levels after local soft tissue or intraarticular GC injections into patients with DM, significant temporal blood glucose level elevation was observed after injection, and the time to peak blood glucose levels was within one to 5 days. However, no severe adverse reactions or complications were reported (13).

Notably, previous studies have generally evaluated blood glucose levels at limited time points rather than continuously. Continuous glucose measurement systems (CGMSs) now enable detailed tracking of glucose changes but have been underutilized in studies evaluating GC-induced hyperglycemia in DM patients (14). Therefore, the exact changes in blood glucose levels after local GC injection in patients with DM are still unclear.

In patients with DM, the type and dosage of GCs influences GC-induced hyperglycemia (4). All administration routes (oral, inhalation, or local) are associated with the risk of hyperglycemia when administered at high doses, and the oral route poses the greatest risk due to systemic exposure (4). Other risk factors, such as old age (> 60 years), high body mass index (BMI, > 25 kg/m^2), high glycosylated hemoglobin (HbA1c, ≥ 6.0%), and glucose tolerance, have also been reported (4). Among the 4 factors we examined in our previous study (age, BMI, glucose level immediately prior to dexamethasone injection, and HbA1c), none was associated with hyperglycemia after dexamethasone injections in patients without DM (9). Type 1 DM and insulin use, rather than HbA1c, were identified as risk factors for GC-induced hyperglycemia following methylprednisolone acetate injections (12). However, this study only assessed fasting glucose levels, leaving the full extent of hyperglycemia and its associated risk factors unclear.

In the present study, we used a CGMS to measure the continuous glucose changes following single-dose dexamethasone injections with nerve blockades in DM patients and investigated the risk factors for hyperglycemia. We also assessed the risk factors for hyperglycemia and examined the relationships among HbA1c levels, DM medications, and changes in glucose levels.

Methods

This prospective cohort study was approved by the Ethics Committee of the Gifu University Graduate School of Medicine (number: 2020-013). Written informed consent was obtained from all the patients.

Patients

A total of 53 consecutive patients with type 2 DM who underwent elective lumbar or sacral nerve root pulsed radiofrequency or lumbar medial branch of the posterior primary rami (facet joint) conventional radiofrequency at Gifu University Hospital (Gifu, Japan) between May 2020 and July 2024 were enrolled. Eligible patients included those who had ever been diagnosed with and treated for DM as well as those diagnosed with pre-DM. The following exclusion criteria were applied: use of GCs within the past 3 months, scheduled administration of GCs or radiological examinations within 2 weeks after the nerve blockade procedure,

prior receipt of the same nerve blockade procedure 3 or more times during the study period, physician-determined ineligibility for participation, or refusal to participate by the patient.

CGM and Dexamethasone Administration

Blood samples were collected to measure glucose levels and HbA1c before nerve blockade. Patients were monitored for interstitial glucose using FreeStyle Libre Pro™ (Abbott Japan Co., Ltd.), a blinded professional sensor-based CGMS designed for retrospective glucose data analyses. After using contrast dye to confirm that the needle tip was not in a blood vessel, we performed pulsed or conventional radiofrequency as a nerve blockade. Subsequently, 0.1 mg/kg dexamethasone (maximum 6.6 mg/body) was administered around the nerve. The sensor, which was worn on the upper arm, required no intervention by the patient or healthcare provider. The data were captured every 15 minutes (96 glucose readings/day) and stored, remaining invisible to the patients and investigators during the monitoring period. After 14 days, data were retrieved wirelessly and transferred to a FreeStyle Libre Pro-Reader (Abbot Japan Co., Ltd.). Summary glucose reports for review and analyses were generated using a software program developed for the system. According to our previous study (9), hyperglycemia was defined as a blood glucose level ≥ 200 mg/dL.

Sample Size

The sample size was determined to prevent overfitting of the statistical model. Based on a linear regression model with continuous variables as objective variables and 4 factors (HbA1c, age, BMI, and pre-procedure glucose level) as explanatory variables, 50 to 60 cases were required to avoid model overfitting and to guarantee generalizability (15). Although a larger sample size would be required by the model to consider nonlinearities, we planned to recruit 53 patients because the data used in this study would be repeated for each case, and thus overfitting would be more easily avoided.

Outcomes

The primary outcome was the blood glucose level at each measurement point after the dexamethasone administration. The secondary outcomes were the area under the curve (AUC) for blood glucose levels above 200 mg/dL, the highest blood glucose levels, and the time to reach the highest blood glucose level after the dexamethasone administration. The AUC was calculated according to the trapezoidal rule.

Statistical Analyses

Descriptive statistics for patient characteristics were calculated as the median and interquartile range (IQR) for continuous variables and frequency (percentage) for categorical variables. Blood glucose levels up to day 10 are shown as scatter plots. The blood glucose levels were determined based on a large amount of repeated data measured every 15 minutes for each patient. Therefore, blood glucose levels over time were modeled using a mixed-effects model, with individuals used as the cluster. The random effect was modeled using a random intercept model. The nonlinear association between glucose level and measurement time was assessed by including cubic splines in the model. The number of knots was set to 10 to assume nonlinearity. The age, BMI, baseline glucose levels, and HbA1c level were included in the model as covariates. A prediction plot of the blood glucose level was drawn based on the predicted value obtained using the nonlinear mixed effect model. To confirm the effects of modified DM medications on blood glucose levels, the main effects experienced by the treatment group (no-medication group, non-insulin-medication group, and insulin group) and the interaction terms between the treatment group and measurement time were included in the mixed-effects model.

The mean AUC for blood glucose levels exceeding 200 mg/mL was calculated up to day 7, and the values for each day were compared using a t-test with the day 7 value as the reference.

We employed ordinal logistic regression to assess the independent effect of risk factors on the AUC because the distribution of the AUC was skewed. Ordinal logistic regression, a popular model for ordinal categorical outcome variables, also works well for skewed continuous outcome variables using data ranks. Age, BMI, baseline glucose level, and HbA1c level were treated as risk factors in the ordinal logistic model.

A multivariable linear regression analysis was performed to compare the number of days until glucose levels no longer exceeded 200 mg/dL among the 3 groups (no medication, medications other than insulin, and insulin users).

Statistical significance was defined as a 2-sided *P*-value of < 0.05. All analyses were performed using the R software program Version 4.1 (www.r-project.org).

Results

Patient Characteristics

Between May 2020 and July 2024, a total of 786 patients underwent elective lumbar or sacral nerve root pulsed radiofrequency or lumbar facet conventional radiofrequency. Among them, 151 patients had been diagnosed with and treated for DM in the past or present or had been diagnosed with pre-DM. Fifty-four patients had undergone the same procedure 3 or more times, 41 patients had used GCs within the past 3 months, one patient was scheduled for a radiological examination within 14 days after the procedure, and dexamethasone was deemed contraindicated in 2 patients due to severely uncontrolled blood glucose levels. During data collection, one patient's data were lost, and 2 patients were found ineligible after providing their consent. Therefore, the data from 50 patients were included in the analysis. The patients' background characteristics are summarized in Table 1.

Changes in the Glucose Levels After Dexamethasone Injections

The changes in each patient's glucose levels over the course of 10 days are shown in Fig. 1A. Fig. 1B shows an enlarged view of the glucose levels up to the third day. Blood glucose levels increased immediately after the dexamethasone injections. The median (IQR) maximum blood glucose level was 328 (250-386) mg/dL, and the median time to reach the maximum level was 592 (400-700) minutes. Although some patients experienced very high blood glucose levels, none reported symptoms of hyperglycemia. The AUC for glucose levels exceeding 200 mg/dL was the highest on the first day and decreased gradually until day 7 (Table 2). The AUC on the first day was significantly larger than on the subsequent days, and the AUCs on days 4 and 5 were significantly larger than those that appeared on day 7 (Table 2).

Risk Factors of Hyperglycemia After Dexamethasone Injections

Among the 4 factors (age, HbA1c, BMI, and glucose level before the procedure), age and HbA1c were significantly associated with an AUC of ≥ 200 mg/dL for 10 days (Table 3). The *P*-value of the global test (analysis of variance [ANOVA]) for HbA1c was 0.023. Patients with HbA1c levels ≥ 7% had significantly higher glucose levels than those with HbA1c levels of < 6% (Table 3). The predicted mean duration until glucose levels no longer exceeded 200 mg/dL was 6.41 days (95% confidence interval [CI]: 5.14, 7.68) for patients with HbA1c of < 7% and 8.41 days (95% CI: 6.69, 10.14) for those with HbA1c ≥7% according to a multivariable linear regression analysis ($P = 0.078$) (age, BMI, and glucose level before the procedure were fixed at the median reported in Table 1). None of the 4 factors was significantly associated with the duration until blood glucose levels no longer exceeded 200 mg/dL (Table 4).

Prediction of Blood Glucose Levels After Dexamethasone Injections

Changes in the blood glucose levels were predicted using a nonlinear mixed-effects model (Fig. 2). The predicted glucose level pattern after day 7 was similar to that observed on day 6. The predicted glucose levels for the 7 days are shown in Fig. 2, adjusted for median baseline values in Table 1 (age: 73 years, BMI: 25.7 kg/m^2, HbA1c: 6.8%, pre-procedure glucose level: 143.0 mg/dL). Most patients were predicted to have glucose levels of > 200 mg/dL on the first day.

Prediction of the Association of HbA1c Value and Blood Glucose Levels After Dexamethasone Injections

We used a nonlinear regression mixed-effects model to predict patients' blood glucose levels over time. Patients with HbA1c of ≥ 7% were predicted to have significantly higher blood levels than those with HbA1c of < 7% ($P < 0.001$, Fig. 3A). This trend persisted throughout the observation period, beyond the first day.

Prediction of the Association of Medication and Blood Glucose Levels After Dexamethasone Injections

Patients treated with insulin were predicted to have significantly higher glucose levels than those treated with noninsulin medications or no DM medication ($P < 0.001$, Fig. 3B). Similarly, patients who took noninsulin medications were predicted to have significantly higher glucose levels than those who received no medication for DM ($P < 0.001$, Fig. 3B).

Discussion

We presented detailed changes in blood glucose levels induced by dexamethasone with nerve blockade in patients with DM. We found that the HbA1c value, age, and DM medications were associated with hyperglycemia.

Compared to our previous study (9) of non-DM patients, DM patients demonstrated higher blood glucose

Table 1. *Patients' characteristics.*

Characteristic	n = 50
Age, years, median (IQR)	73 (62-77)
Male/female, n (%)	30 (60.0)/20(40.0)
Height, cm, median (IQR)	162.0 (153.0-167.0)
Weight, kg, median (IQR)	69.0 (56.0-77.5)
BMI, kg/m^2, median (IQR)	25.7 (22.9-29.4)
HBA1c, %, median (IQR)	6.8 (6.3-7.8)
Glucose level, mg/dL, median (IQR)	143.0 (120.0-178.0)
Medication, n (%)	
No medication	10 (20.0)
Non-insulin	26 (52.0)
Insulin	14 (28.0)

BMI, body mass index; HBA1c, glycosylated hemoglobin; IQR, interquartile range
The number of patients treated with insulin included patients who used combinations of other diabetes mellitus medications.

levels before the procedure (median 143.0 vs. 102.0 mg/dL), higher peak glucose levels (median 328.0 vs. 212.0 mg/dL), and a longer time to peak glucose levels (median 592.0 vs. mean 459.8 min). While blood glucose levels in non-DM patients returned to normal by the second day, DM patients experienced persistent hyperglycemia for up to 6 days. In the present study, dexamethasone was administered between 9:00 and 12:00 A.M., and peak blood glucose levels were observed approximately 10 hours after injection. It is speculated that blood glucose levels may rise after lunch, decrease slightly, and then increase again after dinner. These levels likely reach their maximum postprandially on the first day and exhibit repetitive elevations after meals over the subsequent days.

Among the 4 factors (HbA1c, age, BMI, and pre-procedure glucose levels), age and HbA1c were significantly associated with hyperglycemia following dexamethasone administration. Old age (> 60 years old) is a risk factor for GC-induced hyperglycemia in DM patients (4). Our results were consistent with those of a previous study. According to the standards of care for DM, the target HbA1c value is higher for older DM patients than for younger ones because they have a greater risk of hypoglycemia (16). Our patients may not have had less stringent goals. Patients with HbA1c levels exceeding 7.0% had significantly larger AUCs than did patients with HbA1c levels below 6.0%. In addition, the predicted duration of blood glucose levels that ceased to exceed 200 mg/dL was longer in patients with HbA1c values ≥ 7.0% than in those with values of < 7%, although this difference was not significant. The HbA1c

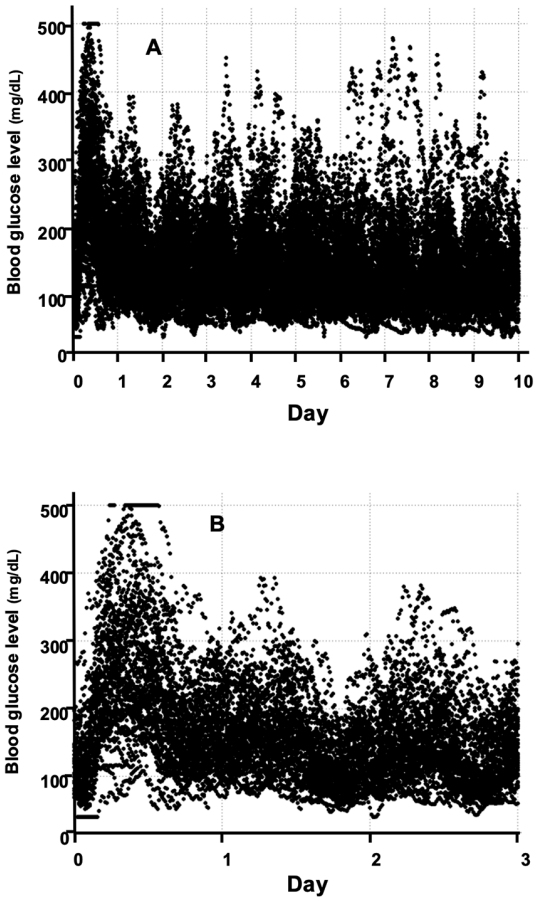

Fig. 1. *Changes in the blood glucose levels of each patient. The patients underwent interstitial glucose monitoring using a CGMS. The raw data from the CGMS are presented. (A) Changes in blood glucose levels up to 10 days after dexamethasone injection. (B) Changes in blood glucose levels up to 3 days after dexamethasone injection.*

Table 2. *The comparison of the AUC between day 7 and all other days.*

Comparison with day 7	Differences (95% CI)	*P*-value
day 1	94.68 (75.18-114.18)	< 0.001*
day 2	15.29 (-0.70-31.28)	0.060
day 3	15.39 (-2.66-33.44)	0.093
day 4	15.32 (4.17-26.46)	0.008*
day 5	16.54 (1.92-31.16)	0.028*
day 6	6.15 (-3.29-15.59)	0.196

Interstitial glucose levels of the patients were monitored using a CGMS. The AUC when the blood glucose level was over 200 mg/dL was calculated and compared between each day and day 7.
*$P < 0.05$ was considered statistically significant.

Table 3. *An ordinal regression analysis of risk factors associated with AUC.*

	Adjusted OR (95% CI)	*P*-value
HbA1c, compare with less than 6%		
between 6 and 7%	4.55 (0.44-47.02)	0.197
between 7 and 8%	28.17 (1.90-417.43)	0.016*
more than 8%	69.01 (3.30-1443.96)	0.007*
Age, years	1.08 (1.01-1.16)	0.035*
BMI, kg/m^2	0.96 (0.83-1.11)	0.546
Baseline glucose level, mg/dL	1.01 (0.99-1.03)	0.298

Patients were monitored for interstitial glucose levels using a CGMS. The AUC of the blood glucose level and time over 200 mg/mL for 10 days were calculated. The group with an HbA1c level of < 6 was the reference group.
*$P < 0.05$ was considered statistically significant.

Table 4. *An ordinal regression analysis of risk factors associated with the duration until blood glucose levels no longer exceeded 200 mg/dL.*

Factors	β (95% CI)	*P*-value
HbA1c, >7% population	2.000 (-0.233-4.232)	0.078
Age, years	0.007 (-0.090-0.104)	0.890
BMI, kg/m^2	-0.047 (-0.258-0.163)	0.652
Baseline glucose level, mg/dL	0.006 (-0.016-0.028)	0.577

Patients were monitored for interstitial glucose levels using a CGMS. Ordinal logistic regression was used to assess the independent effect of risk factors on the time until the blood glucose levels no longer exceeded 200 mg/dL.

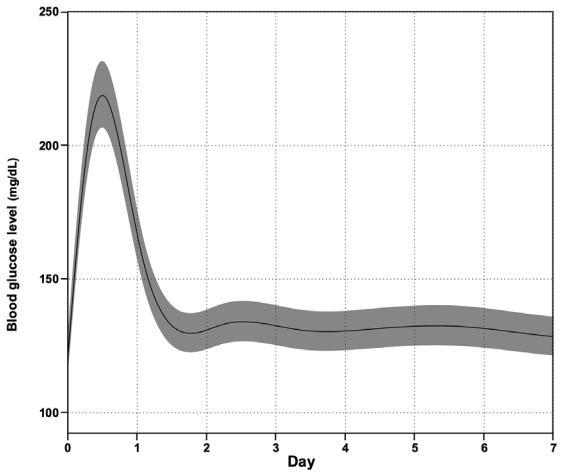

Fig. 2. *Prediction of blood glucose levels after dexamethasone injection. The blood glucose levels were obtained from data recorded by the CGMS. To predict the blood glucose levels over time, a non-linear mixed-effects model was used. Adjusted for an age of 73 years, the results were a BMI of 25.7 kg/m^2, an HbA1c of 6.8%, and a pre-procedure glucose level of 143.0 mg/dL. The gray shaded area indicates the 95% confidence interval.*

value reflects average glycemia over approximately 2-3 months and is strongly associated with DM complications (16). A previous study identified the predictors of hyperglycemia following GC injections in patients with DM (12). Among the several factors (gender, type of DM, medication type, injection location, HbA1c, and GC dose), the presence of type 1 DM or the use of insulin predicted that a patient would have higher blood glucose levels after 20-120 mg methylprednisolone acetate injection into the hand or wrist than the patient did before the injection (12). In that study, only fasting blood glucose levels were compared. Since HbA1c is more affected by postprandial blood glucose levels than by fasting blood glucose levels in patients with HbA1c of < 8.0% (17), HbA1c may not have been associated with glucose elevations in the previous study (12). Our findings suggest that poor daily glucose control, as indicated by high HbA1c levels, results in more pronounced hyperglycemic responses to GCs.

Based on our results, most patients were predicted to have blood glucose levels > 200 mg/mL on the first day. Judging from the AUC above 200 mg/dL, the glucose levels gradually decreased over 6 days. A study reported that 40 mg of epidural triamcinolone (equivalent to 7.5 mg of dexamethasone) injection significantly increased both fasting and postprandial blood glucose levels for up to 3 days in patients with DM (11). Triamcinolone is more potent but shorter acting than dexamethasone, and most patients in that study were not insulin users. Similarly, another study using CGMSs found elevated blood glucose levels up to the third day after non-insulin-using patients with type 2 DM received injections of 40 mg methylprednisolone acetate (equivalent to 3 mg dexamethasone) injection into the shoulder (14). In previous studies, the patients did not use insulin, and GC was weaker and had a shorter half-life than in our study. Thus, we cannot simply compare our present findings with those of previous studies. The duration of hyperglycemia may possibly depend on the GC type (titer and half-life) and treatment of DM (whether or not patients use insulin).

The present study included patients with DM of varying disease severity. Therefore, we predicted differences in the severity of DM control and medications for DM. Our results predicted that patients with HbA1c

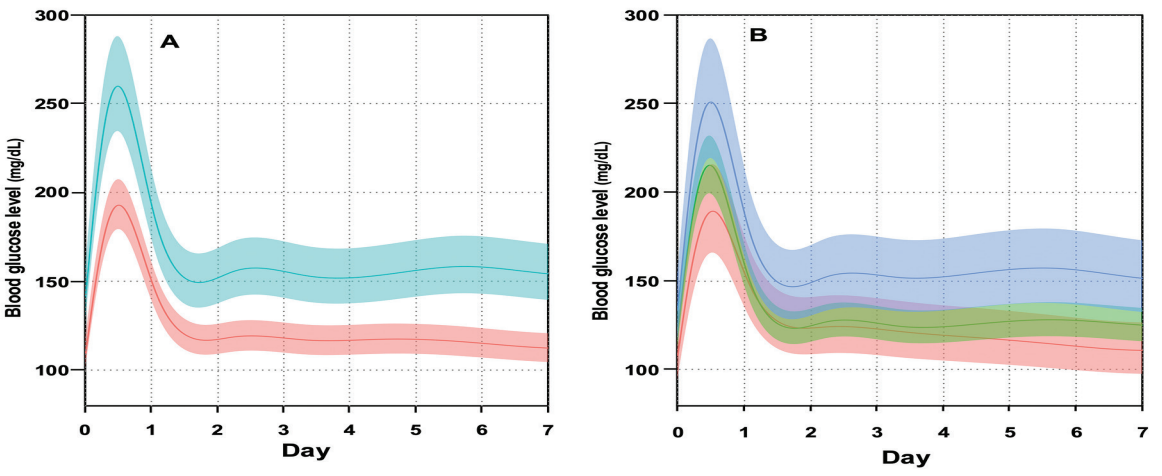

Fig. 3. *The comparison of predicted blood glucose levels after dexamethasone injection. The blood glucose levels were obtained from the data recorded by the CGMS. To predict the blood glucose levels over time, a non-linear mixed-effects model, including treatment group-time interaction terms, was used.*
(A) The comparison between patients with HbA1c <7.0% (red) and those with HbA1c ≥7.0% (green).
(B) The comparison of 3 groups based on their medications. The no-medication group is shown in red, the non-insulin-medication group in green, and the insulin-user group in blue. The insulin-user group included patients taking both insulin and non-insulin medications. The shaded area indicates the 95% confidence interval.

values of < 7% had significantly lower blood glucose levels than did patients whose HbA1c values stayed at ≥ 7% over 7 days. These findings align with the American Diabetes Association Professional Practice Committee recommendation that the HbA1c goal for many non-pregnant adults be < 7% (16). In addition, our results suggested that DM treatment regimens were associated with blood glucose levels after dexamethasone injections. The American Diabetes Association Professional Practice Committee recommends that insulin initiation be considered regardless of the background glucose-lowering therapy (18). Insulin users, who often have relatively severe DM, are predicted to exhibit more severe GC-induced hyperglycemia than do DM patients who are not currently undergoing insulin treatment.

In the present study, only a single dose of dexamethasone was administered. It has been reported that the injection of 40 mg triamcinolone into the epidural space increases both fasting and postprandial blood glucose levels by more than 20 mg injection in DM patients (11) and that 8-10 mg dexamethasone increases blood glucose levels by more than 4 mg in patients with type 2 DM (19). The Society for Ambulatory Anesthesia strongly recommends low-dose dexamethasone (4 mg) for DM patients undergoing ambulatory surgery (20). Careful consideration of the type and dosage of GCs is essential for patients with DM.

When administered perineurally, dexamethasone acts on GC receptors located on the neuronal membrane, increasing the expression of inhibitory potassium channels and reducing the excitability of unmyelinated C-fibers (21). Perineural co-administration of local anesthetics with dexamethasone prolongs analgesia (21). Recent studies have highlighted the additional benefits of using dexamethasone in nerve blockades for chronic pain. One example consists of combining injections of dexamethasone into the Gasserian ganglion with pulsed radiofrequency for trigeminal postherpetic neuralgia, which provides stronger and longer-lasting analgesic effects than pulsed radiofrequency alone (22). Another study shows that dexamethasone decreases post-neurotomy pain after facet radiofrequency neurotomy (23). However, the benefit of the addition of GCs to nerve blockades has not been firmly proven. Further evidence is needed regarding the efficacy of GCs in combination with peripheral nerve blockades.

Several limitations associated with the present study warrant mention. Firstly, GCs are metabolized by cytochrome p450 3A4, so medications that influence this pathway may alter GC clearance (3). Some of our patients were taking such medications. Secondly, preoperative insulin management details, including insulin dosing, timing of the last dose, and types of

insulin (long-acting or short-acting), were not fully documented. Thirdly, the potential contribution of stress-induced hyperglycemia could not be excluded. Finally, we were unable to record the meal timing and caloric intake, which might have influenced the results.

Conclusion

Patients with DM experienced significant hyperglycemia after even a single dose of dexamethasone. Age and HbA1c levels were risk factors for hyperglycemia. Higher preprocedural HbA1c levels, reflecting poorer daily glucose control, were associated with increased blood glucose levels.

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