Perioperative liraglutide therapy for orthopedic patients with type2 diabetes

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Background and aimsive

Diabetic patients with limited exercise during the orthopedic perioperative period tend to gain weight, and their glycemic control frequently deteriorates. However, temporary insulin therapy has a risk of hypoglycemia. To investigate the efficacy and safety of perioperative liraglutide therapy (a glucagon-like peptide-1 receptor agonist) , we performed a retrospective case analysis.

Research design and methods

Informed consent forms were obtained, and liraglutide was introduced after cessation of OADs. Orthopedic patients with type2 diabetes (T2DM) were initially treated with 0.3 mg of liraglutide and allowed to dose-titrate up to 0.9 mg/day before elective orthopedic operations. The change in body weight, fluctuation of glycemic level, and perioperative complications were retrospectively analysed.

Kind of Operation	Number of Cases (M/F)
Spine Surgeries	10 (5/5)
Artificial Knee Joint Replacement	6 (3/3)
Total Hip Arthroplasty	4 (0/4)
Amputation of Toe Necrosis	1 (1/0)
Bone Fracture Surgeries	3 (2/1)
foramen magnum decompression	1 (0/1)

Algorithm of therapy

admission　　operation(Day 0)　　Day3

＜140~160mg/dl　150~250mg/dl　＜140mg/dl

(Target blood glucose level : 2 hours post prandial blood glucose)

In cases of hyperglycemia during operation, regular insulin was added according to blood glucose level.

glucose (mg/dl)	added regular insulin (unit)
200～249	4
250～299	6
300～349	8
350～	10

After operation:

Liraglutide was administered again from 0.6 mg when meals were started.

Case profiles

Number of Case（M/F）	25 (13/11)
Age (years)	69.1±13.2
BMI	26.9±2.9
HbA1c (%)	7.7±1.1
Duration of Disease（year）	10.0±9.5
Fasting CPR/PG x10^2 *(ng･ml^{-1}･mg^{-1}/dl)*	1.6±0.7
Urinary CPR (μg/day)	71.1±54

Values are means ± SD.

Medication used before liraglutide therapy

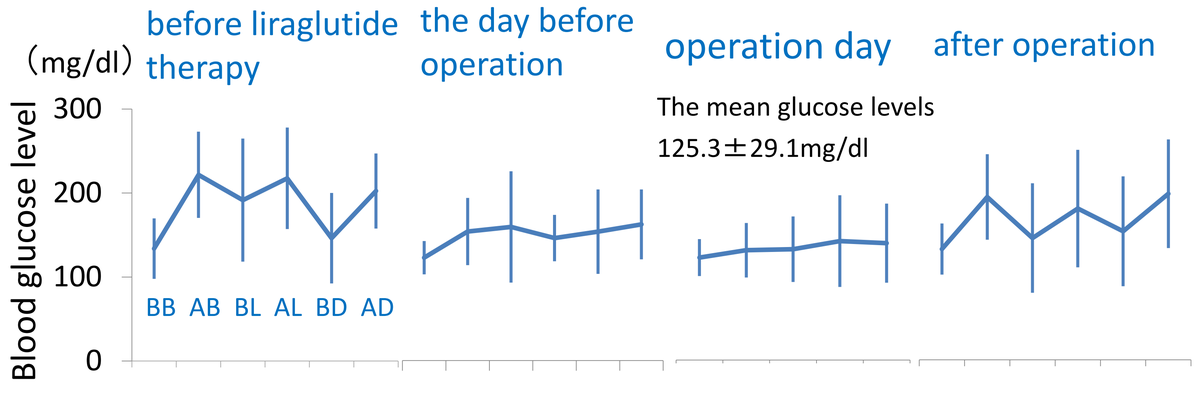
No treatment		Number of Cases	
		4 (1 cessation of therapy)	
Oral Therapy	Number of Medications	Number of Cases	w/ SU
	4	3	1
	3	1	1
	2	8	8
	1	3	0

SU: Sulfonylurea. glimepirid 1.0±0.9 mg per day

Insulin Therapy	Case
	3 (mean of *insulin glargine 12.7 unit per day)*

Results

1. Glucose profile



Liraglutide therapy achieved effective glycemic control throughout perioperative period.

BB: before breakfast, AB: after breakfast, BL: before lunch, AL: after lunch, BD: before dinner AD: after dinner

2. Insulin needed after operation and the change in BMI

	Orthopedics
Insulin	4 patients :3.0±1.1Unit/day x 1day 1 patients : 12Unit/day x 3days
Change in Body Weight (kg) (BMI)	-3.5±2.0 (25.7±2.6)
Systolic Blood Pressure (mmHg)	125.5±17.5
Diastolic Blood Pressure (mmHg)	67.2±14.4

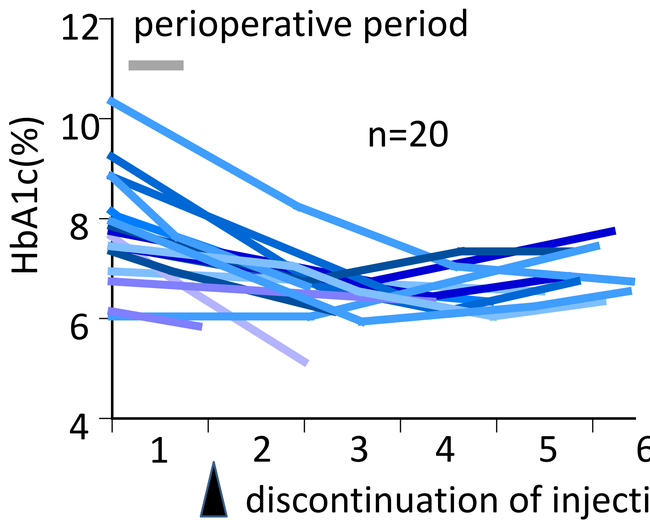
Values are means ± SD.

Additional regular insulin was only needed after in 5 patients.

The decrease in weight was achieved before operation.

Although 17 patients suffered from hypertension, average systolic and diastolic blood pressure for paients on operation day was stable.

3. The improvement of HbA1c for 6 months after operation



Blood glucose level of almost all liraglutide –discontinued patients were kept in good control without medication or with only oral antidiabetic

4. Complications

Hypoglycemic episodes, wound healing retardations or other complications were not observed .

Discussion

1. Liraglutide is an option available to safely achieve good glycemic control in the elective perioperative period, especially for obese orthopedics patients because of decrease in weight.
2. In cases of hyperglycemia after operations, which is thought to be induced by overactive stress hormones, additional regular insulin should be considered.
3. As liraglutide decreases gastrointestinal motility, using liraglutide for patients undergoing gastrointestinal surgery should be avoided.

Conclusion

Liraglutide provides an effective option to safely achieve good glycemic control in perioperative orthopedic operation patients with T2DM, especially those with limited exercise ability and those at risk of hypoglycemia.