



THE UNIVERSITY OF  
**CHICAGO**  
MEDICINE &  
BIOLOGICAL  
SCIENCES

AT THE FOREFRONT OF MEDICINE®

57-year-old man presenting using U-500 insulin to the hospital

## Endorama

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Second year adult endocrine fellow

**October 2019**



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MEDICINE

# OBJECTIVES

- Review U-500 insulin
- Review UChicago policy about the use of U-500 in the hospital
- Review literature about the use of U-500 in the inpatient settings
- Safety and considerations for U-500 insulin use

# HPI

- 57-year-old man with PMH of morbid obesity (BMI= 59), HFrEF (EF of 49% in 2017), HTN, HLD, DM and CAD

**Chief complain:** 8 months of worsening SOB and leg swelling

**Consult for:** T2DM on U-500 insulin

- He cannot take 5 steps without getting short of breath and can not lie flat
- Patient noted to be hypoxic and was put on 4L NC with an oxygen saturation of 91%
- He was given IV Lasix 40 mg and admitted for further diuresis and workup for heart failure

# IN ER...

ER call you for insulin management as he reported taking U-500 insulin **400 U BID** with meals

		CCD Adult Emergency D		
		09/13 0		
Time:		0955	1549	182
Glucose (mg/dL)		Graphs cannot displa		
▼ Accucheck				
POC Glucose				
▼ Serum Glucose				
Serum Glucose		177	57	
▼ Insulin Dose				
insulin HIGH CONC U-500 human regular Inpn (units)...				

What would you do?

# DM HISTORY

- T2DM more than 15 years ago, + Charcot arthropathy, + neuropathy, and does not have significant retinopathy
- The patient reported taking his insulin all the time with his meals for years
- Seen by Endo at Uchicago clinic a year PTA and he was sent home on 250 BID of U-500

# IN ER...

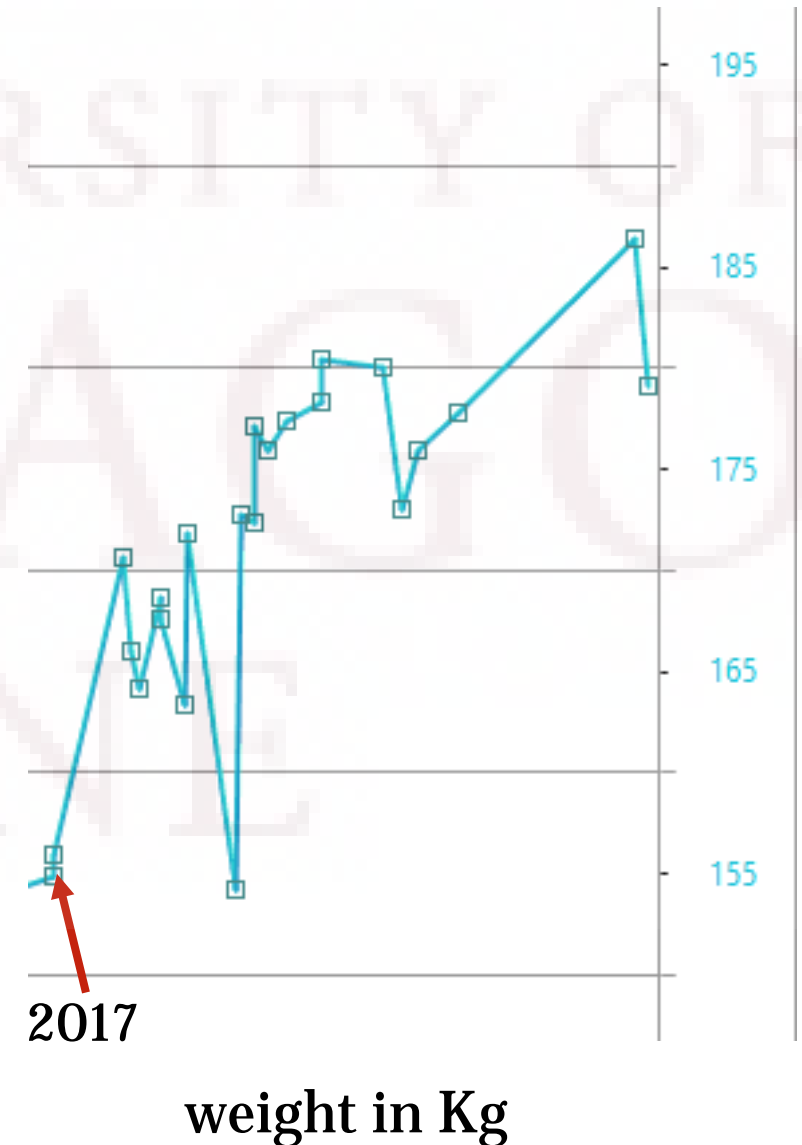
	CCD Adult Emergency De...		
	09/13 0700 -		
Time:	0955	1549	1824
Glucose (mg/dL)	Graphs cannot display in		
▼ Accucheck			
POC Glucose			164
▼ Serum Glucose			
Serum Glucose	177	57	
▼ Insulin Dose			
insulin HIGH CONC U-500 human regular Inprn (units)...			

- This AM, he did not take his insulin and his BG in the ER is 177
- He ate turkey sandwich, fruits and pudding along some crackers
- his 2 hrs post-prandial BG was 164 with no insulin



# MORE HISTORY

- Meals:
  - No breakfast
  - Lunch: leftovers from wife's previous night take-out
  - Dinner: Meat and potatoes; bucket of fried chicken
  - Snacks: Chips, ice cream, cookies
- He does not exercise due to chronic knee and back pain
- Over the past 2-3 years, he has gained approximately 100 lbs





PMH:

- Cataract
- Charcot's arthropathy
- Chronic stable angina
- Essential hypertension
- GERD
- HFrEF
- Hyperlipidemia
- OSA (obstructive sleep apnea) does not wear CPAP

PSH:

- I&D soft tissue abscess in neck

PFH:

- |                                     |                         |
|-------------------------------------|-------------------------|
| • Hypertension                      | Father                  |
| • Dyslipidemia/Hypercholesterolemia | Father                  |
| • Heart Disease                     | Father                  |
| • <b>T2DM</b>                       | Sister and both parents |

## SH:

- Smoking status: never smoker
- Sedentary job

## Meds:

- Aspirin 81 QD
- Lipitor 80mg QD
- Coreg 6.25mg BID
- Cozaar 100mg QD
- Lyrica 75mg TID
- Metformin 1000mg BID
- Montelukast 10mg QHS
- Pantoprazole 40mg BID
- Humilin U-500: 400 units BID
- Trulicity once per week (was on Victoza before, but switched due to insurance issues)
- Toremide 20mg QD

# REVIEW OF SYSTEMS

- Constitutional: Negative for chills, fever and malaise/fatigue
- HENT: Negative for ear discharge and hearing loss
- Eyes: Negative for blurred vision
- Respiratory: Positive for **cough, shortness of breath and wheezing**
- Cardiovascular: Positive for **palpitations**. Negative for chest pain
- Gastrointestinal: Negative for abdominal pain, constipation, diarrhea, nausea and vomiting
- Genitourinary: Negative for dysuria and urgency
- Musculoskeletal: **back pain, knees pain**, but no falls
- Skin: Negative for rash
- Neurological: **tingling in fingers and toes**. Negative for tremors and weakness
- Endo/Heme/Allergies: Negative for polydipsia
- Psychiatric/Behavioral: Negative for substance abuse and suicidal ideas. The patient is **nervous/anxious**
- All other systems reviewed and negative

# PHYSICAL EXAM

- BP 103/56 | Pulse 77 | Temp 36.5 °C (97.7 °F) | Resp 22 | SpO2 95% | **BMI= 59**
- Constitutional: no acute distress, **morbidly obese**
- HEENT: EOMI, oropharynx clear
- Neck: supple, no thyromegaly, no acanthosis nigricans, no skin tags
- Cardiovascular: regular rate, no extra heart sounds
- Pulmonary/Chest: good respiratory effort, clear to auscultation bilaterally
- Abdomen: bowel sounds present, soft, non-tender, no violaceous striae, no lipodystrophy
- Musculoskeletal: moving all extremities, no deformity, +2 edema
- Neurological: no focal deficits
- Skin: warm, dry
- Psychiatric: **agitated**





# U-500 R-INSULIN

- U-500 regular insulin was first introduced into clinical practice in 1952 and has been in practice since 1990s
- It is 5-fold concentrated form of regular insulin
- Survey administered to internal medicine physicians and ward nurses, 47% reported they were “very uncomfortable” with the use of U-500 insulin

## PK:

- Time-to-onset: 30 minutes
- Peak insulin levels: 1.75 to 4 hours (mean, approximately 3 hours)
- Duration of action: 6.5 to 12 hours after SubQ abdominal injection

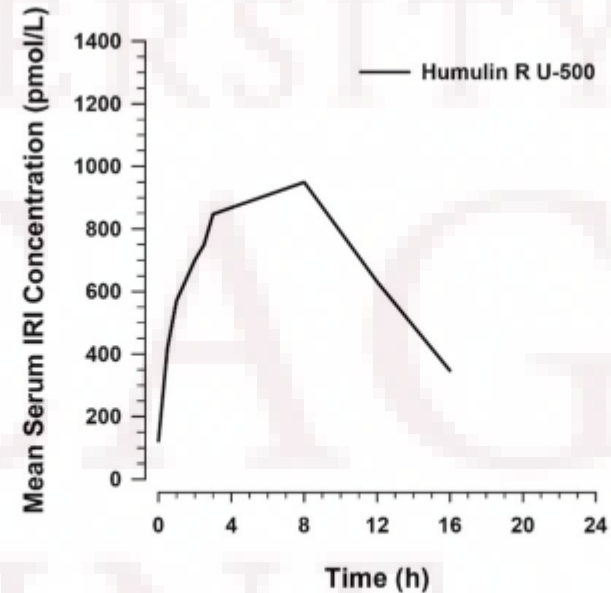


Figure 2: Mean Serum Insulin Concentrations Versus Time After Subcutaneous Injection of a 100 U Dose of HUMULIN R U-500 Healthy Obese Subjects

<https://pi.lilly.com/us/humulin-r-u500-pi.pdf>

# INSULIN RU-500 USES

In cases where insulin resistance is evidence in:

- Obese patients (>200 U of insulin daily)
- New etiologies of severe insulin resistance:
  - The use of protease inhibitors for HIV and GVHD after bone marrow transplantation, both of which may result in an acquired form of lipodystrophy
- Insulin receptor defects (type A insulin resistance syndromes)
- Insulin receptor autoantibodies (type B insulin resistance syndrome)
- Posttransplant state while on high-dose glucocorticoid
- Severe systemic infection
- Gestational DM with severe insulin resistance



# INSULIN RU-500 BENEFITS AND CONCERNS

Potential benefits of using concentrated insulins:

- Decreased volume, number of injections, and pain
- Less frequent pen changes
- Possibility of improved adherence
- Insulin pump enhancements:
  - (i) higher maximum bolus
  - (ii) higher maximum basal rate
  - (iii) less frequent infusion set change/reservoir refills

**Greater risk of serious insulin errors without proper nursing, patient, and physician education**

# CONCENTRATED INSULIN(S)

**Table 1 – Concentrated insulins currently available.**

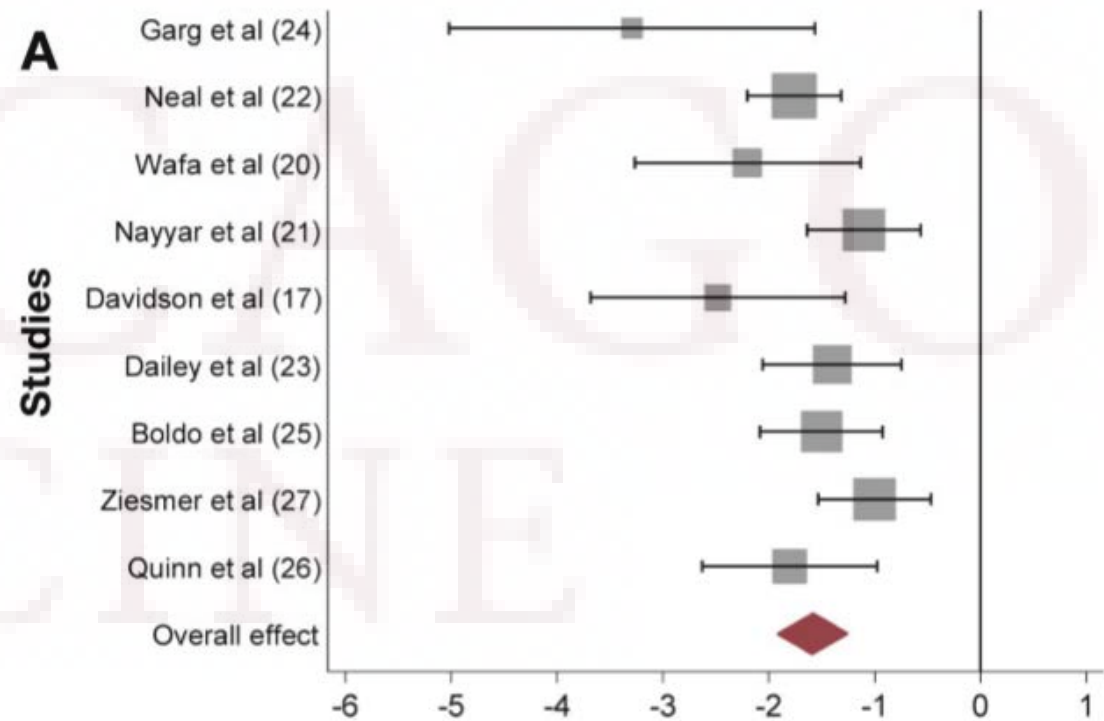
	Regular U-500 <sup>a,b</sup>	Regular U-500 <sup>a,b</sup>	Glargine U-300 <sup>a,c</sup>	Glargine U-300 <sup>c</sup>	Degludec U-200 <sup>a,d,e</sup>	Lispro U-200 <sup>a,e,f</sup>
Device	Vial	Pen	Pen	Pen	Pen	Pen
PK/PD characteristics	Prandial and basal	Prandial and basal	Basal	Basal	Basal	Prandial
Bioequivalent	No	No	No	No	Yes	Yes
Unit increments	5	5	1	2	2	1
Maximum dose (Units)	250 <sup>g</sup>	300	80	160	160	60
Units/device	10,000	1500	450	900	600	600
Storage and handling in use (days)	40	28	42	42	56	28
Minimum daily units <sup>h</sup>	250 <sup>i</sup>	54 <sup>i</sup>	11	20	11	21

# META-ANALYSIS OF STUDIES REPORTING U-500R USE

- Patients using insulin by multiple daily injections (MDI) and via CSII in nonpregnant T1DM and T2DM patients
- Mean baseline HbA1c was 9.1–11.3%, and TDD was 219–391 units
- After U-500R initiation, there was a significant HbA1c reduction reported in all studies, ranging 1.0–3.29%, with an overall reduction of 1.59% [95% confidence interval (CI), 1.26–1.92] based on the meta-analysis
- Significant weight gain of 4.38 kg (95% CI, 2.35–6.41)
- TDD insulin dose increased significantly by 51.9 units (95% CI, 19.6–84.1)

## Hypoglycemia:

- Not reported to be more frequent than U-100 R use
- One study, however, did find a significant increase in mild hypoglycemia from 13% to 42%



Changes in HbA1c with an overall significant reduction of 1.59% (95% CI, 1.26–1.92);



**BACK TO THE PATIENT**

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CCD Adult Emergency De... | N03S

09/13 0700 - 09/14 0659

09/14 0700 - 09/14

Time:

0955

1549

1824

0012

0307

0536

0803

1321

Glucose (mg/dL)

Graphs cannot display in the current view

▼ Accucheck

POC Glucose

164

363

391

354

418

▼ Serum Glucose

Serum Glucose

177

57

407

▼ Insulin Dose





**THE USE OF INSULIN U-500 IN HOSPITAL**





**SHOULD WE SWITCH TO U100 UPON ADMISSION?**



# VA STUDY 1

- Retrospective case-series
- 116 admissions for 63 unique patients using U500 in O/p

Institutional policy requires converting U500 to U100 at 50% of the dose after admission

**Table 1 – Baseline characteristics.**

	All (n = 116)	<8% (n = 36)	8.0–8.99% (n = 23)	≥9% (n = 57)	p=
Age (years)	61.9 (38–78)	61.28 (38–72)	62.49 (50–78)	61.98 (42–74)	NS
BMI (kg/m <sup>2</sup> )	41.6 (24.4–65.1)	42.97 (31.2–65.1)	42.21 (28.1–63.8)	40.38 (24.4–63.8)	NS
Race (% caucasian)	94%	100%	91.3%	91.2%	NS
Total medications (number/patient)	16.2 (6–33)	16.97 (9–33)	15.6 (10–21)	16 (6–24)	NS
Statins (%)	84%	78%	78%	90%	NS
RAS agents (%)	81%	81%	83%	81%	NS
ASA (%)	78%	75%	78%	81%	NS
Beta blockers (%)	80%	78%	65%	79%	NS
Neuropathy medications (%)	55%	47%	39%	67%	0.04
Kidney disease (%)	36%	58%	22%	28%	0.003
Cardiovascular disease (%)	84%	82%	96%	79%	NS
Pre-admit HbA1c	8.86 (5.5–14)	6.9 (5.5–7.9)	8.5 (8.0–8.9)	10.2 (9–14)	<0.001
Admitting diagnoses n (%)					
Cardiovascular	50 (43%)	16 (44%)	13 (57%)	21 (37%)	NS
Cerebrovascular	5 (4%)	0	0	5 (9%)	NS
Diabetes	9 (8%)	2 (6%)	2 (9%)	5 (9%)	NS
Infection	14 (12%)	6 (17%)	0	8 (14%)	NS
Pancreatitis	1 (1%)	0	0	1 (2%)	NS
Pulmonary	7 (6%)	3 (8%)	2 (9%)	2 (4%)	NS
Renal	6 (5%)	2 (6%)	1 (4%)	3 (5%)	NS
Other	24 (21%)	7 (19%)	5 (22%)	12 (21%)	

HbA1c = glycated haemoglobin. Data shown is mean (range) or percent of patients as indicated. n = number of admissions.

# VA STUDY 1

	<8% (n = 36)	8.0–8.99% (n = 23)	>9.0% (n = 57)	p=
Home TDD (unit/day)	489.39 ± 247.38	320.65 ± 188	372 ± 264.8	0.004
Home TDD (unit/kg/day)	3.49 ± 1.55	2.45 ± 1.50	3.01 ± 1.82	NS
Inpatient TDD (unit/day)	100.35 ± 110.25	78.93 ± 83.93	81.4 ± 66.18	NS
Inpatient TDD (unit/kg/day)	0.69 ± 0.71	0.59 ± 0.66	0.69 ± 0.59	NS
Length of stay (days)	4.14 (1–31)	4.57 (1–37)	5.9 (1–99)	NS
NPO (%)	30.6%	13%	18%	NS
Admitting insulin regimen				
Insulin glargine + insulin aspart or insulin regular (%)	47.2%	69.5%	63.2%	NS
Basal only (insulin glargine) (%)	0%	0%	0.04%	NS
Correction factor only (insulin regular or insulin aspart) (%)	44.4%	21.7%	22.8%	NS
Premix insulin (NPH/Regular) (%)	3%	0%	3.5%	NS
Intravenous drip (insulin regular) (%)	3%	0%	5%	NS
No insulin (%)	3%	4%	2%	NS
Inpatient glycemic control				
% Low (<70 mg/dL)	4%	3.2%	2%	NS
% Controlled (70–180 mg/dL)	41.7%	52.1%	27.8%	<0.001
% Uncontrolled (181–300 mg/dL)	43%	36.6%	45.8%	NS
% Very uncontrolled (>300 mg/dL)	11.3%	8.1%	24.4%	0.001
% Reduction in insulin dosing	79.5%	75.4%	78.1%	NS
Discharged on U-500 (%)	97.20%	82.60%	89.50%	NS
Discharge TDD (units/day)	461.52 (±246.75)	286.1 (±195.6)	330 (±276.32)	0.003
On U500 6 months post discharge	94.40%	65.20%	75.9	0.01
Home TDD 6 months post discharge	467.43 (±275.4)	274.32 (±189)	333.11 (±297)	0.006
HbA1c 6 months post discharge	7.2% (5.4–9.7)	8.4% (5.6–11.2)	9.2% (6.5–12)	<0.001

# VA STUDY 1

- Patients in this study underwent an average decrease of **77.4%** in their home insulin dose during hospital admission
- This finding likely reflects the large impact of **reduced carbohydrate** intake on insulin requirements (they will be on DM diet)
- Given that patients in all three of the study groups remained **uncontrolled** approximately 50% of the time, with a low incidence of hypoglycemia, the results of this study suggests that a 50% reduction in home insulin doses may be an appropriate initial dose reduction



**SHOULD WE CONTINUE WITH U500 IN THE HOSPITAL?**



# U-500 VS. U100 IN THE HOSPITAL

- 61 patient
- (Group A): 41 patients (67%) remained on U-500
- (Group B): 20 patients were switched to a non-U-500-based insulin regimen

Characteristics	All patients N = 61	Group A <sup>a</sup> n = 41	Group B <sup>b</sup> n = 20	P (A vs. B)
% Male	59.0	53.6	70.0	.220
Age, years median (25 <sup>th</sup> , 75 <sup>th</sup> )	60.8 (52.6, 66.6)	59.5 (50.4, 66.0)	64.6 (54.0, 68.3)	.100
LOS in days median (25 <sup>th</sup> , 75 <sup>th</sup> )	5.0 (3.0, 8.0)	4.0 (3.0, 6.0)	10.5 (4.5, 13.5)	.003
HbA1c, prior admission in % median (25 <sup>th</sup> , 75 <sup>th</sup> )	8.9 (7.7, 10.3)	9.2 (7.7, 10.3)	8.4 (8.1, 9.2)	.560
BMI, kg/m <sup>2</sup> median (25 <sup>th</sup> , 75 <sup>th</sup> )	38.4 (34.3, 48.6)	40.5 (35.7, 52.8)	37.5 (29.2, 44.1)	.090
% Cardiovascular indication for admission	27.9	14.6	55.0	<.001
% Surgical intervention	21.0	17.0	30.0	.240
% Endocrinology consult	60.6	68.0	45.0	.080
% Steroid use	13.0	19.5	0.0	.034
% NPO (for >50% of hospital stay)	18.0	17.0	20.0	.780

# U-500 VS. U100 IN THE HOSPITAL

Characteristics	All patients N = 61	Group A <sup>a</sup> n = 41	Group B <sup>b</sup> n = 20	P (A vs. B)
BG during hospitalization, mg/dL, median (25 <sup>th</sup> , 75 <sup>th</sup> )	223.9 (184.9, 266.3)	237.6 (180.6, 279.0)	207.9 (192.6, 248.3)	.480
Daily insulin dose, U prior to hospitalization median (25 <sup>th</sup> , 75 <sup>th</sup> )	205 (101, 295)	235 (150, 300)	100 (52, 275)	.068
Daily insulin dose during hospitalization, U median (25 <sup>th</sup> , 75 <sup>th</sup> )	129 (377, 253)	200 (130, 311)	35 (19, 69)	<.001
Daily insulin dose per body weight during hospitalization median (25 <sup>th</sup> , 75 <sup>th</sup> )	0.96 (0.32, 0.96)	1.6 (0.8-2.3)	0.3 (0.2, 0.7)	<.001
% Hypoglycemia days, mean (SD)	11.2 (18.7)	15.3 (21.3)	2.8 (6.4)	<.001
% Severe hypoglycemia days, mean (SD)	0.5 (3.3)	0.1 (0.8)	1.3 (5.6)	NA
% Hyperglycemia days, mean (SD)	79.4 (26.6)	78.9 (28.0)	80.6 (24.2)	.550
% Severe hyperglycemia days, mean (SD)	13.4 (19.3)	16.8 (21.9)	6.3 (9.8)	<.001

Abbreviations: BG, blood glucose; NA, not applicable.  
<sup>a</sup>Patients who were given U500 for 50% or greater of their hospital stay  
<sup>b</sup>Patients who were switched to a different insulin regimen or were given U500 for less than 50% of their hospital stay.

# INSULIN RESISTANCE INPATIENT

**TABLE 1.** Causes of insulin resistance in the hospitalized patient

Agent
"Stress" hormones
Obesity
Electrolyte disorders: hypokalemia, hypocalcemia, hypercalcemia, and hypomagnesemia
TPN and enteral nutrition
Fatty emulsion (e.g. Intralipid), including medications that are administered in fatty emulsion such as propofol
Corticosteroids and other immune suppressants (tacrolimus and sirolimus)
Anesthetic agents: isoflurane, sevoflurane
Hormone products: megestrol acetate (Megace), octreotide, leuprolide (Lupron), bicalutamide
Hormone disorders: Cushing's syndrome, hormone-secreting tumors (e.g. glucagonoma or somatostatinoma), acromegaly, hyperaldosteronism, hyperthyroidism, hypothyroidism, and pheochromocytoma
Other medical illnesses known to contribute to hyperglycemia: pancreatitis, hepatitis C, cystic fibrosis
Miscellaneous genetic or other acquired rare causes of insulin resistance: Rabson-Mendenhall syndrome, familial partial lipodystrophy, congenital generalized lipodystrophy, type A or B insulin resistance syndrome





**SHOULD WE DECREASE TDD UPON ADMISSION**

# ADA STANDARD OF CARE FOR DM 2019

- “Diabetes Care in the Hospital: regarding concentrated insulin (U-200,U-300,orU-500) in the inpatient setting, it is important to ensure the correct dosing by utilizing an individual pen and cartridge for each patient, meticulous pharmacist supervision of the dose administered, or other means.”

MEDICINE

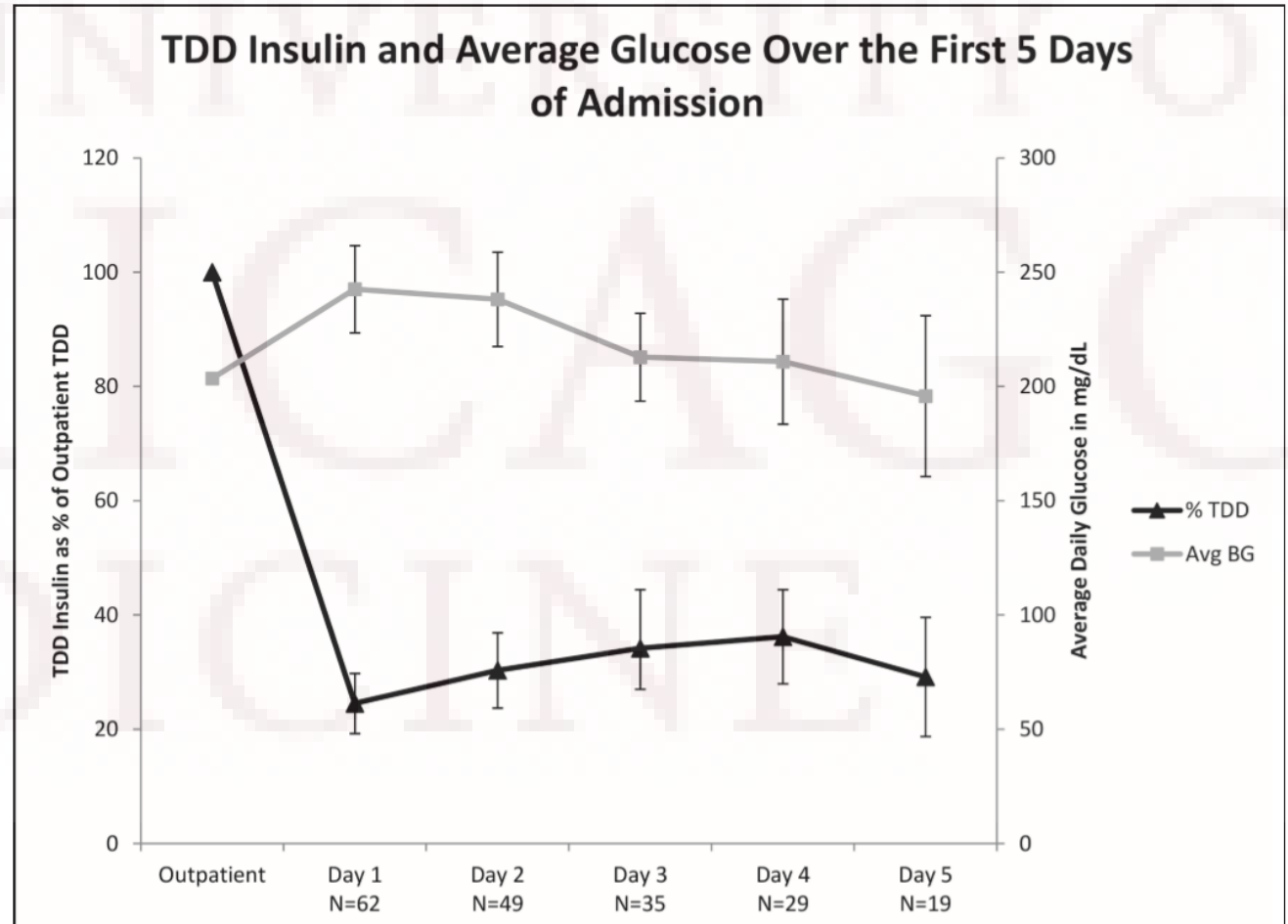
# VA STUDY 2

- Retrospective chart review study
- 27 qualifying patients, with a total of 62 separate admissions
- All patients were converted from U-500 to various U-100 insulin regimens upon admission

	Mean	Minimum	Maximum
Age (years)	64.4	47	85
BMI (kg/m <sup>2</sup> )	38.9	26.4	54.7
HbA1c (%)	8.7	5.7	15.5
HbA1c (mmol/mol)	71.6	38.8	145.9
Estimated average glucose (mg/dL) <sup>a</sup>	203.5	117	398
Outpatient TDD insulin (units of insulin)	337.6	100	1,250
Outpatient units of insulin per kg	3.0	0.8	11.8
Length of stay (days)	4.0	1	16
Average inpatient BG (mg/dL)	234.4	97	450
Average inpatient TDD Insulin (units of insulin)	91.0	8	400
Inpatient units of insulin per kg	0.8	0.1	3.7

# VA STUDY 2

- 89% of patients requiring  $\leq 50\%$  of their outpatient TDD



# VA STUDY 3

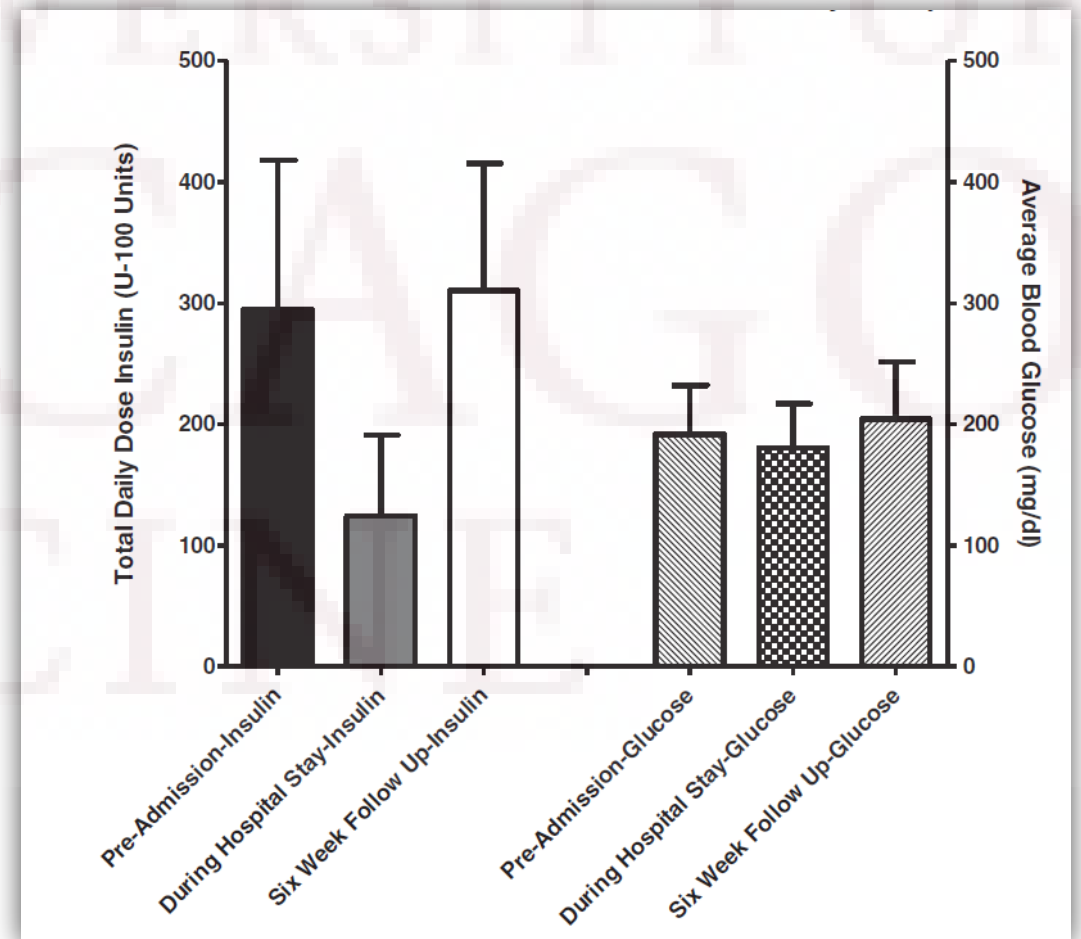
- Inpatient study of 20 type 2 diabetes receiving U-500 insulin in the ambulatory setting
- patients were transitioned to receive U-100 insulin

	% or mean $\pm$ SD (n = 20)
Length of stay (days)	3.9 $\pm$ 1.2
Endocrinology service consulted	75%
Cardiovascular indication for admission	45%
Infectious indication for admission	45%
Surgical intervention	10%
Steroid use during admission	5%
Patients receiving subcutaneous insulin during hospitalization only	20%
Patients receiving intravenous insulin during hospitalization	80%
Blood glucose during hospitalization (mg/dL)	180 $\pm$ 36
Blood glucose in patients receiving only subcutaneous insulin during hospitalization (mg/dL)	186 $\pm$ 51
Blood glucose in patients receiving intravenous insulin during hospitalization and then transitioned to subcutaneous insulin (mg/dL)	177 $\pm$ 34
Total incidence of hypoglycemia (episodes)	5 <sup>a</sup>
Total incidence of severe hypoglycemia (episodes)	0
Expressed as mL of U-500 insulin	0.58 $\pm$ 0.22
Insulin units (expressed as U-100) per kg	2.1 $\pm$ 0.8



# VA STUDY 3

Propose that patients using U-500 insulin in the ambulatory setting be transitioned to U-100 insulin at a 50% dose of their outpatient needs and titrate to euglycemia



# VA STUDY 2

**Table 4**

Comparison of our study with previous studies.

	Kedia et al.	Paulus et al. <sup>17</sup>	Tripathy and Lansang <sup>a18</sup>
Sample size of included patients (n)	20	27	20
Age (years)	64.3	64.4	64.6
Length of stay (days)	3.9	4	10.5
Male (%)	100	70	70
Hemoglobin A1c (%)	8.3	8.7	8.4
Body mass index (kg/m <sup>2</sup> )	44.5	38.9	37.5
Ambulatory total daily dose (pre-admission)	288	337.6	100
Average hospitalization total daily dose	124	91	35
Ambulatory total daily dose (post-discharge)	310		
Average blood glucose (mg/dL)	180	234.4	207.9
Endocrine consultation during hospitalization (%)	75		80



# MORE STUDIES...

- A retrospective 95 patients chart review of adult patients using U-500 insulin prior to admission to Beaumont Hospitals
- Seventeen patients were continued on U-500 insulin
- 78 received U-100 insulin during their inpatient stay
- Proportion of insulin administered inpatient relative to the prior to admission dose was similar between the two groups (59% in the U-500 group and 46% in U-100 group;  $p = 0.1344$ )
- ?significantly more hypoglycemia events in the U-500 group compared to the U-100 group

# UCHICAGO- POLICY AND PROCEDURE BULLETIN JUNE 2018

- Additional safety precautions were added for high concentration saline and U500 insulin
- Nursing signature will be required upon receipt of U-500 insulin vial and pen
- All U-500 insulin pumps must have a pharmacist present when the pump is being refilled
- On patient care units, U-100 insulin vials should be stored in locked pockets in the medication dispense cabinets. U-500 insulin vials will be stored in a locked box in the pharmacy, pharmacist will deliver the medication to the floor prior to the dose due time
- U-500 insulin pens will be stored in a patient-specific pocket in the medication dispensing cabinet

# UCHICAGO POLICY AND PROCEDURE

## UNIVERSITY OF CHICAGO MEDICAL CENTER

**POLICY NAME:** U-500 Insulin

**POLICY NUMBER:** PH 02-309

**ISSUE DATE:** December 2017

**REVISED DATE:** N/A

### **PURPOSE:**

1. To outline the receiving, storage, filling, ordering and dispensing of U-500 insulin vials and pens.
2. Pharmacists caring for patients requiring U-500 insulin will adhere to the following policy. The policy applies only to adult patients in Mitchell and CCD hospitals.

### **FORMULARY STATUS:**

- I. U-500 insulin vials are restricted to approval by Endocrinology (fellow or attending). U-500 insulin vials are only to be used for refilling insulin pumps as continuation of home therapy for patients receiving U-500 insulin in their insulin pump prior to admission.
- II. U-500 insulin pens are restricted to approval by an Endocrinology **Attending**. U-500 insulin pens are only to be used as continuation of home therapy or as an alternative for patients on an insulin pump with U-500 insulin whose pump malfunctions and are unable to receive pump therapy.



**BACK TO THE PATIENT**

THE UNIVERSITY OF  
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MEDICINE

# THE UNIVERSITY OF

09/18 0700 - 09/19 0659							09/19 0700 - 09/20 0659					
0823	1338	1345	1346	1609	1837	1847	2222	0424	0803	1013	1248	1338
203	308				395		481		284		321	
				404			350					
100			100			100				130		130
		10										

U-500



# BACK TO PT

- Reports SOB has improved
- Put out 8L of urine and discharged on torsemide 40 mg BID
- Discharged on 130 units of U500 TID with meals

# KEY POINTS

- U-500 insulin is 5-fold concentrated form of regular insulin
- Time-to-onset is 30 minutes with peak around 1.75 to 4 hours (mean, approximately 3 hours) and duration of action of 6.5 to 12 hours after SubQ abdominal injection
- It can be used in severe insulin resistant patients (>200 U a day)
- Patients using U-500 insulin in the ambulatory setting be transitioned to 50% dose of their outpatient needs and titrate to euglycemia

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*THANK YOU*

**Questions/comments?**