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Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

ORAL ANTIDIABETIC DRUGS: CLINICAL OVERVIEW

For Type 2 Diabetes Management

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ORALANTIDIABETIC DRUGS: CLINICAL OVERVIEW

For Type 2 Diabetes Management

Classification & Overview

❒ Classification of Oral Antidiabetic Drugs

Class	Examples	Primary Action
Biguanides	Metformin	↓Hepatic glucose production
Sulfonylureas	Glimepiride, Gliclazide, Glibenclamide	↑Insulin secretion
Meglitinides	Repaglinide, Nateglinide	↑Rapid insulin secretion
Thiazolidinediones (TZDs)	Pioglitazone, Rosiglitazone	↑Insulin sensitivity
DPP-4 Inhibitors	Sitagliptin, Vildagliptin, Teneligliptin	↑Incretin effect
SGLT2 Inhibitors	Dapagliflozin, Empagliflozin	↑Renal glucose excretion
Alpha-glucosidase Inhibitors	Acarbose, Voglibose	↓Intestinal glucose absorption

Mechanism of Action

❒ Biguanides (Metformin)

- Activates AMPK → ↓ hepatic gluconeogenesis
- ↑ Peripheral glucose uptake
- Weight neutral or modest loss

❒ Sulfonylureas

- Binds SUR1 receptor → closes K□ channels → insulin release
- Long-acting; risk of hypoglycemia

❒ Meglitinides

- Similar to sulfonylureas but short-acting
- Targets postprandial glucose spikes

❒ Thiazolidinediones (TZDs)

- Activates PPAR-γ → ↑ insulin sensitivity
- Slow onset (weeks); durable effect

❒ DPP-4 Inhibitors

- Inhibits DPP-4 enzyme →prolongs GLP-1 action
- ↑ Insulin, ↓ Glucagon
- Weight neutral; low hypoglycemia risk

❒ SGLT2 Inhibitors

- Blocks SGLT2 in renal tubules →glycosuria
- Cardio-renal benefits

❒ Alpha-glucosidase Inhibitors

- Inhibits intestinal enzymes →delays carbohydrate digestion
- ↓ Postprandial glucose

Dosing & Adverse Effects

❒ Typical Dosing Guidelines

Class	Drug	Starting Dose	Max Dose
Biguanides	Metformin	500 mg OD/BID	2000–2500 mg/day
Sulfonylureas	Glimepiride	1–2 mg OD	6 mg/day
Meglitinides	Repaglinide	0.5–1 mg before meals	4 mg TID
TZDs	Pioglitazone	15–30 mg OD	45 mg/day
DPP-4 Inhibitors	Sitagliptin	100 mg OD	100 mg/day
SGLT2 Inhibitors	Empagliflozin	10 mg OD	25 mg/day
Alpha-glucosidase	Voglibose	0.2–0.3 mg TID	0.3 mg TID

❒ Common Adverse Effects

Class	Adverse Effects
Biguanides	GI upset, lactic acidosis (rare)
Sulfonylureas	Hypoglycemia, weight gain
Meglitinides	Mild hypoglycemia
TZDs	Weight gain, edema, heart failure risk
DPP-4 Inhibitors	Nasopharyngitis, headache, pancreatitis
SGLT2 Inhibitors	Genital infections, dehydration, ketoacidosis
Alpha-glucosidase	Flatulence, bloating, diarrhea

Contraindications & Clinical Pearls

❒ Contraindications

Class	Contraindications
Biguanides	eGFR <30, liver failure, alcoholism
Sulfonylureas	Severe hepatic dysfunction, pregnancy
Meglitinides	Caution in elderly, hepatic dysfunction
TZDs	Heart failure (NYHA III/IV), bladder cancer
DPP-4 Inhibitors	History of pancreatitis
SGLT2 Inhibitors	Recurrent UTIs, hypotension, eGFR <30
Alpha-glucosidase	Severe GI disorders, cirrhosis

❒ Clinical Pearls

- **Metformin:** First-line; weight neutral; cost-effective
- **Sulfonylureas:** Effective but monitor for hypoglycemia
- **DPP-4 inhibitors:** Safe in renal impairment (dose-adjusted)
- **SGLT2 inhibitors:** Cardio-renal benefits; monitor hydration
- **TZDs:** Durable effect; monitor for edema and weight gain
- **Alpha-glucosidase inhibitors:** Useful in high-carb diets; GI intolerance common

Approved Fixed Dose Combinations (FDCs) in India

These combinations are approved by CDSCO and commonly prescribed in Tamil Nadu for convenience and improved glycemic control.

❒ Commonly Approved FD

Combination	Purpose
Metformin + Glimepiride	Basal control + insulin secretion
Metformin + Gliclazide	Similar to above, with modified release options
Metformin + Pioglitazone	Insulin sensitization + hepatic control
Metformin + Voglibose	Postprandial control + hepatic control
Metformin + Teneligliptin	Incretin effect + hepatic control
Metformin + Sitagliptin	Widely used in urban centers
Metformin + Dapagliflozin	Glycosuria + hepatic control
Glimepiride + Metformin + Pioglitazone	Triple therapy for insulin resistance
Metformin + Glimepiride + Voglibose	Popular in high-carb diet regions
Metformin + Glimepiride + Teneligliptin	Triple oral therapy for advanced T2DM

Timing guide for Oral Antidiabetic Combinations

Combination	When to Take	Rationale
Metformin + Glimepiride	**Before food**	Glimepiride stimulates insulin—best taken 15–30 min before meals to prevent postprandial spikes
Metformin + Gliclazide	**Before food**	Gliclazide is a sulfonylurea—take before meals for optimal insulin release
Metformin + Pioglitazone	**After food**	Pioglitazone has no direct postprandial effect; metformin tolerability improves with food
Metformin + Voglibose	**Just before food**	Voglibose delays carbohydrate absorption—must be taken immediately before meals

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Metformin + Teneligliptin	**After food**	DPP-4 inhibitors are weight neutral and can be taken with or after food
Metformin + Sitagliptin	**After food**	Sitagliptin is well tolerated with food; metformin GI side effects reduced
Metformin + Dapagliflozin	**After food**	SGLT2 inhibitors can cause dehydration—taking after food helps reduce GI upset
Glimepiride + Metformin + Pioglitazone	**Before food**	Sulfonylurea component requires pre-meal dosing; others are flexible
Metformin + Glimepiride + Voglibose	**Just before food**	Voglibose and Glimepiride both need pre-meal timing for best effect
Metformin + Glimepiride + Teneligliptin	**Before food**	Glimepiride needs pre-meal dosing; Teneligliptin and Metformin are flexible

❒ Clinical Tips:

- **Metformin alone:** usually **after food** to reduce GI upset.
- **Sulfonylureas (Glimepiride, Gliclazide): before meals** to match insulin release with glucose load.
- **Voglibose: just before meals**—its action is localized to the gut.
- **DPP-4 and SGLT2 inhibitors:** flexible, but **after food** is preferred for tolerability.

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