TRT Effect on Diabetes and Obesity

(research articles followed by pertinent notes from the articles)

1.

Metabolic Effects of Testosterone Replacement Therapy in Patients with Type 2 Diabetes Mellitus or Metabolic Syndrome: a Meta-Analysis {International Journal of Endocrinology - 2020 Sep 30;2020:4732021}
https://pmc.ncbi.nlm.nih.gov/articles/PMC7545471/

Men with T2DM and Metabolic syndrome frequently have hypogonadism.
TRT has been shown to have beneficial effects for these patients.
1415 patients studied - **results demonstrated reductions in HbA1c levels, decreased insulin resistance, decreased LDL levels (bad lipids) and triglycerides, decreased body weight and waist diameter, and significantly improved AMS (aging male symptoms)** - no changes in erectile function (not expected in this group)

2.

Treatment with Testosterone Therapy in Type 2 Diabetic Hypogonadal Adult Males: A Systematic Review and Meta-Analysis {Clinical Practice 2023 Mar 20;13(2):454-469}
https://pmc.ncbi.nlm.nih.gov/articles/PMC10037582/

TRT greatly improves glycemic management by significantly reducing glycated hemoglobin (HbA1c) levels.
It reduces levels of insulin resistance and fasting glucose levels. It also lowers total cholesterol, triglycerides, and LDL (bad) cholesterol while raising HDL cholesterol (good). They recommend TRT in SYMPTOMATIC men with type 2 diabetes.

3.

Remission of type 2 diabetes following long-term treatment with injectable testosterone in patients with hypogonadism and type 2 diabetes: 11-year data from a real-world registry study {Diabetes Obesity Metabolism 2020 Jul 15;22(11):2055-2068}
https://pmc.ncbi.nlm.nih.gov/articles/PMC7689919/ 356 men followed up for 11 years!

…had significant **progressive and sustained reductions in fasting glucose, glycated hemoglobin (HbA1c) and fasting insulin** over the treatment period. In the control group, fasting glucose, HbA1c and fasting insulin increased. Among the **patients treated with testosterone 34.3% achieved remission of their diabetes and 46.6% of patients achieved normal glucose regulation. Of the testosterone-treated group, 83.1% reached the HbA1c target of 47.5 mmol/mol (6.5%) and 90% achieved the HbA1c target of 53.0 mmol/mol (7%).** In contrast, no remission of diabetes or reductions in glucose or HbA1c levels were noted in the control group. **There were fewer deaths, myocardial infarctions, strokes and diabetic complications in the testosterone-treated group.**

4.

Testosterone replacement therapy improves insulin resistance, glycemic control, visceral adiposity, and hypercholesterolemia in hypogonadal men with type 2 diabetes {European Journal of Endocrinology 2006 Jun;154(6):899-906
https://pubmed.ncbi.nlm.nih.gov/16728551/

TRT clearly improved insulin sensitivity. HbA1c and fasting blood glucose levels were also improved. Truncal fat and waist circumference both diminished. Obvious reduction in the risk profiles for adverse cardiovascular events.

Many many other studies yield the same benefits across the board. ***Bottom line = men with symptoms consistent with low T and the comorbidities of type 2 diabetes and /r metabolic syndrome (obesity, high blood pressure, high blood sugar, high triglycerides, low HDL levels) should be treated with TRT - fix the hormonal problems and decrease adverse cardiovascular risk profiles.***

5.
Dr. Reina Villareal (endocrinologist professor at Baylor University College of Medicine) led a study that appeared in Frontiers in Endocrinology in 2022. ***Baseline Testosterone Predicts Body Composition and Metabolic Response to Testosterone Therapy*** {Front Endocrinol (Lausanne). 2022 Jul 11;13:915309}
https://pmc.ncbi.nlm.nih.gov/articles/PMC9309506/

TRT improves body composition even if men don't meet the 'official' guidelines for lowT. In addition to older men, about **35% of men older than 45 and 50% of men with obesity or type 2 diabetes have low T.** Research found that men, regardless of their baseline testosterone levels, benefited to some extent from TRT. **Contrary to what they expected, men with T levels above the 'official' cut off for low T experienced greater benefit from a metabolic standpoint, including reduced HbA1c and blood glucose levels (ie, those with 'normal' T levels) benefit from testosterone.**

6. Study of 83,000 Veterans finds cardiovascular benefits to testosterone replacement
Normalization of testosterone level is associated with reduced incidence of myocardial infarction and mortality in men {*European Heart Journal*, Volume 36, Issue 40, 21 October 2015, Pages 2706–2715}
https://academic.oup.com/eurheartj/article/36/40/2706/2293361

Study demonstrated that **treated men had lower risks of heart attack, stroke, or death from any cause (all cause mortality).** To obtain that benefit the treatment had to achieve getting their T levels back to normal. "It is the first study to demonstrate that significant benefit is observed only if the dose is adequate to normalize the total testosterone levels." The average follow-up across the men studied was 4.6 - 6.2 years. **The treated men were 56% less likely to die during the follow-up period, 24% less likely to suffer a heart attack, and 36% less likely to have a stroke. WOW!**