Diabetes Fever

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Abstract

While diabetes manifests multiple clinical presentations, complications and comorbidities, most modern discourse focuses on the cardiovascular aspects of the syndrome. In this communication, we explore the vast spectrum of fever and diabetes. We highlight the bidirectional interactions between febrile illness and diabetes, as well as drug-drug interactions. These multifaceted connections must be understood by all health care professionals who manage diabetes and/or fever.

Keywords: Glycaemia, hyperglycaemia, infectious disease, pyrexia, tropical disease

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Introduction

Diabetes is closely linked with infectious disease.[1] The JPMA has carried articles on this relationship[2] as well as on the role of vaccination.[3] In this communication we explore the expansive relationship between fever and diabetes (Table). While fever can be a symptom of infection, it's presentation may be confounded by diabetes, as well as diabetes therapy. Various other clinical pearls are listed in the table.

Summary

The self-explanatory table provides a useful ready reckoner, and teaching tool, for students and professionals pursing diabetes care

References

1. Casqueiro J, Casqueiro J, Alves C. Infections in patients with diabetes mellitus: A review of pathogenesis. Indian journal of endocrinology and metabolism. 2012;16(Suppl1): S27-S36.
2. Atreja A, Kalra S. Infections in diabetes. J Pak Medic Assoc. 2015; 65:1028-30.
3. Kalra S, Verma M, Agrawal N. Vaccine hesitancy in primary care: Building bridges by understanding barriers. J Pak Medic Assoc. 2022; 72: 2565-66.

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Table: Diabetes fever.

Diabetes as a cause of fever
- Fever due to cause of diabetes
  - Acute pancreatitis
  - Viral infections, e.g., COVID-19, Coxsackie virus B, rotavirus, mumps, cytomegalovirus
- Fever due to pathognomic infections
  - Emphysematous pyelonephritis
  - Malignant otitis externa
  - Mucormycosis
  - Fournier's gangrene
- Fever due to complications of diabetes
  - Diabetic foot
  - Autonomic neuropathy

Confounding clinical presentations
- Symptoms as mimics of fever
  - Easy fatiguability
  - Nonspecific aches and pains
- Influence of fever on diabetes
  - Stress hyperglycaemia
- Atypical presentations
  - Leukocytosis in DKA
  - Lack of fever in sepsis in poorly controlled diabetes

Diabetes therapy as a cause of fever
- Infections associated with diabetes therapy
  - Urinary tract infections with SGLT2i
  - Abscesses with inappropriately injected insulin
- Haematological abnormalities associated with diabetes therapy
  - Lymphopenia with saxagliptin
  - Anaemia with metformin
- 'Fever mimetics' associated with diabetes therapy
  - Sensation of heat and shivering in hypoglycaemia

Impact of diabetes in fever management
- Immunity
  - Lower immunity in uncontrolled diabetes may necessitate longer duration of antimicrobial therapy
- Renal function
  - Higher risk of renal impairment may limit choice and dose of antimicrobial therapy
- Polypharmacy
  - Use of multiple concomitant therapy predispose to greater risk of drug-drug interactions

Possibility of drug-drug interaction
- Anti fungal therapy
  - Fluconazole may increase efficacy of SUs
- Anti bacterial therapy
  - Fluoroquinolones, e.g., gatifloxacin, levofloxacin may increase efficacy of SUs
  - Clarithromycin, tigecycline, ertapenem can cause hypoglycaemia
- Antiviral therapy
  - Corticosteroids, dolutegravir may cause hyperglycaemia
  - Older anti-HIV medication is associated with hyperglycaemia (nucleoside reverse transcriptase inhibitors-zidovudine, stavudine, didanosine; protease inhibitors-indinavir, lopinavir)

Impact of fever on diabetes management
- Dietary therapy
  - Encourage 3+3 meal pattern
  - Palatable and easily digestible foods should be preferred in sick and convalescent patients
- Oral anti diabetic therapy
  - Be aware of possible adverse effects that may limit usage in sick persons
    - Gastrointestinal effects with metformin, GLP1RA
    - Genitourinary effects with SGLT2i
    - Hypoglycaemia with sulfonylureas
  - May shift to insulin if OADs are not tolerated during febrile illness

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- ♦ Insulin therapy
  - Match insulin regimen and dose to meal pattern and quantity
  - Use small, frequent doses
  - Prefer ultrarapid acting analogues
  - Post meal insulin may be administered if food intake/digestion is uncertain
  - Shift to intravenous insulin in critically ill patients

Tuberculosis and diabetes

- ♦ Diabetes increases the risk of tuberculosis, as well as atypical pulmonary and non-pulmonary tuberculosis
- ♦ Tuberculosis is a risk factor for diabetes
- ♦ Drug-drug interactions may confound management of tuberculosis and diabetes
  - Rifampicin may reduce efficacy of SU, pioglitazone
  - Rifampicin may increase the efficacy of metformin
  - INH may reduce efficacy of SU, metformin, pioglitazone

Psychosomatic cause of "fever"

- ♦ Individual hyperresponsiveness
  - Diabetes distress ("fever of diabetes")
  - Insulin distress ("fever of insulin")
- ♦ Family hyper responsiveness
  - Culinary cruelty
  - Dietary draconism
- ♦ Societal hyperresponsiveness
  - Stigma
  - Ostracization

GLP1RA= glucagon-like peptide 1 receptor agonists; OADs=oral anti diabetic drugs; SGLT2i= sodium glucose cotransporter 2 inhibitors; SUs= sulfonylureas.