

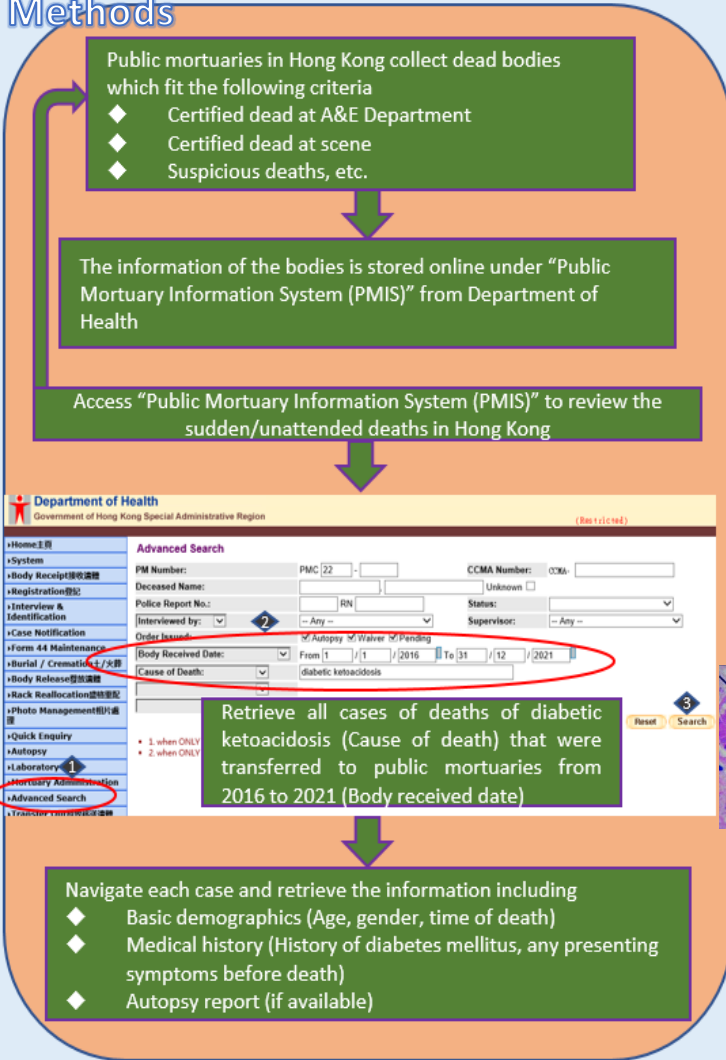
# Sudden / Unattended deaths due to diabetic ketoacidosis in Hong Kong

Wong Ho Yan  
Forensic Pathology Service,  
Department of Health

## Introduction

Diabetic ketoacidosis (DKA) is a serious complication of diabetes mellitus which can be fatal. It is commonly precipitated by underlying stress, infection, myocardial infarction or lack of insulin administration, etc. Typical presentations of diabetic ketoacidosis include vomiting, abdominal pain and polydipsia. However, it may also result in sudden deaths without any prior symptoms noted. This presentation will look into the cases of sudden or unattended deaths due to diabetic ketoacidosis in recent 6 years in Hong Kong.

## Methods



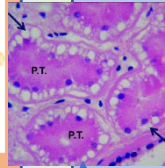
## Presentation before deaths in DKA cases

Presentation before death	No. of cases	Presentation before death	No. of cases
Vomiting	10	Chills	2
Abdominal pain	4	Slurred speech	1
Weight loss / polydipsia / polyuria	4	Generalized discomfort	2
Shortness of breath	3	No noted prior symptoms	37
Dizziness	1		

## Autopsy findings in DKA cases

59 out of 63 cases had autopsies done:

- Autopsy findings were mostly non-specific grossly and microscopically
  - Typical findings as in individuals with long-standing diabetes mellitus and/or other comorbidities including ischaemic heart disease (25 cases)
  - Other co-existing conditions which may/may not contribute to developing diabetic ketoacidosis, including pyelonephritis (3 cases), pneumonia (2 cases) and intestinal obstruction due to inguinal hernia (1 case)
- Armani-Ebstein lesion (subnuclear vacuolation of proximal tubules in kidneys) was found microscopically in 1 case
- Diagnosis of diabetic ketoacidosis is made by elevated
  - Glucose level in vitreous humour (**Diabetic**)
  - Acetone level in blood (**Ketoacidosis**)



Vitreous humour random glucose level (mmol/L)	No. of cases
< 30	11
30 – 40	14
40 – 50	10
>= 50	9

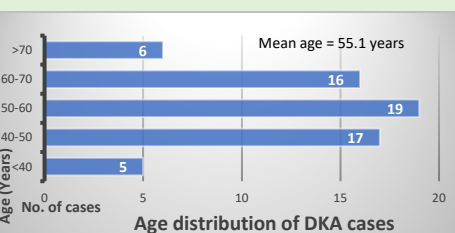
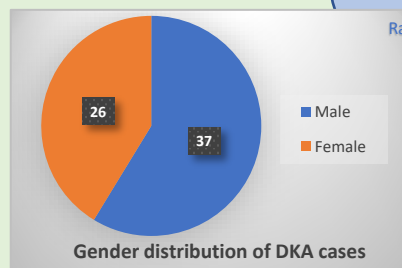
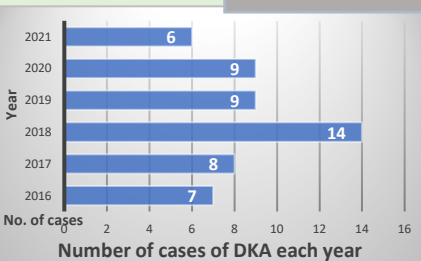
Blood acetone level (mg / 100mL)	No. of cases
< 10	6
10 – 20	10
20 – 30	14
30 – 40	7
40 – 50	8
>= 50	7

Vitreous humour glucose levels in DKA cases  
Range = 11.6 – 60.7 mmol/L  
Mean = 37.7 mmol/L

Blood acetone level in DKA cases  
Range = 5 – 78 mg/100mL  
Mean = 31.9 mg/100mL

## Results

Total number of cases from 2016 to 2021 = 63



Diagnosis status	No. of years of diagnoses of DM made	No. of cases
Undiagnosed of DM = 20 cases	< 5 years	6
Defaulted follow-up = 4 cases	5 – 10 years	6
Insulin-dependent = 16 cases	10 – 15 years	12
Previous history of DKA = 3 cases	15 – 20 years	3
	>= 20 years	6

Prevalence of DKA cases with respect to duration of diabetes mellitus

## Conclusion

- Individuals with poorer diabetic control are more prone to develop diabetic ketoacidosis
- It is not uncommon for individuals without prior diagnosis of diabetes mellitus to have diabetic ketoacidosis
- It is not uncommon for individuals not noted to have any prior symptoms before deaths by diabetic ketoacidosis
- Crucial diagnostic evidence of diabetic ketoacidosis depends on significantly elevated vitreous humour glucose level and blood acetone level