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# Lethal Over-the-Counter Cardioselective Drugs: An Urgent Call to Policy Makers

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**Abstract**—Drug overdose is a common presentation in emergency departments, and overdose of cardioselective agents warrants special attention, given its association with high mortality and morbidity. This study reports a case of cardioselective overdose with suicidal intent. We shed light on the accessibility in Saudi Arabia of these life-threatening drugs, and explore the nature of public health intervention to reduce to reduce the risk of misuse.

**Index Terms**—Cardioselective Drugs over the counter, Suicide by medication

## I. INTRODUCTION

With the remarkable advances in the pharmaceutical industry, medications are available today which, when used appropriately, can dramatically improve the quality of a patient's life. Nevertheless, inappropriate use of drugs is a public health concern, given the impact thereof on patients, the healthcare system and economic productivity. Inquiry into intentional drug overdose, in particular, is imperative – this being the most common method of suicide attempt in Saudi Arabia, Korea, Australia and India [1-4] [1]. An investigation is required into the medications used for suicide and how these medications are accessed.

Overdose of cardioselective medications is associated with high mortality and morbidity [5,6], with beta-blocker and calcium channel blocker overdoses accounting for approximately half of all cardioselective drug overdoses, according to the American Association of Poison Center [7]. Because the literature focuses on acute management rather than prevention, the latter requires further examination.

Beta-blockers, calcium channel blockers and digoxin require a prescription for dispensing in several countries [8-11]. In Saudi Arabia, however, lack of legislation enables the over-the-counter sale of these medications [12]. Investigation into the inappropriate use of these drugs revealed that self-prescription of beta-blockers was not uncommon in the community [13]. This calls for further analysis of the use and misuse of this class of drugs.

Here, we report a case of an adult female who attempted suicide by overdosing on cardioselective medication purchased without prescription. We also explore the dispensing attitude

of pharmacists, particularly with regard to cardioselective medications.

## CASE PRESENTATION

A 40-year-old female was brought to the emergency department complaining of shortness of breath, chest discomfort, lethargy, nausea and vomiting, after attempting suicide. The patient reported that she had used an online search engine to find 'the easiest way to kill herself', and 'digoxin' had appeared in the search results. She went to a local pharmacy and requested some bottles of digoxin; she bought them and ingested 100 tablets of 0.25 mg each.

After two hours she developed nausea and vomiting, followed by dizziness and lethargy. Some time later, she also experienced shortness of breath and chest discomfort.

Her vital signs were within normal range (temperature: 36.1°C, BP: 135/75 mmHg, HR: 76 bpm, RR: 18/min, SpO<sub>2</sub>: 97%, blood glucose: 5 mmol). The initial ECG revealed a digoxin effect, evolving into sinus arrhythmia, atrial flutter and atrial tachycardia, as illustrated in Figure 1. Upon arrival, the patient's VBG values revealed metabolic acidosis, with pH: 7.27, PCO<sub>2</sub>: 46.2 mmHg, lactate: 3.4 mmol/L, HCO<sub>3</sub>: 18 mEq/L, and a slight increase in potassium: 4.8 mEq/L. The VBG parameters improved after six hours of resuscitation. Her renal profile revealed a normal creatinine level: 55 umol/L; urea: 1.8 mmol/L; the rest of the laboratory work was within normal range, including liver function test and coagulation profile. The digoxin level was 5.2 ng/mL, subsequently decreasing to 2.4 ng/mL. Other medication levels were within normal limits. After two of days of monitoring, the patient was discharged in good health.

Thereafter, the researchers visited four different pharmacies, using a proxy of similar character to the abovementioned patient: an adult female requesting cardioselective medications without prescription. The demographic character is based on the reported age group that showed the highest rate of suicide of the Saudi population [14]. The requested medications were amlodipine, verapamil, diltiazem and digoxin (packs available on the Saudi market are: amlodipine - 30 tablets/5 mg; verapamil - 20 tablets/240 mg; diltiazem - 30 tablets/90 mg; and digoxin - 100 tablets/0.125 mg). These medications were selected for their toxicity based on the number and dose of tablets within each pack [15-17]. The pharmacists' response to the request for any of these cardioselective medications was recorded using five criteria: 1) Did the pharmacist ask about the indication for use of any of these medications? 2) Did the pharmacist ask about the appropriate dose? 3) Did the pharmacist ask for a prescription? 4) Was there any hesitancy in dispensing any of the medications? 5) Outcome (dis-

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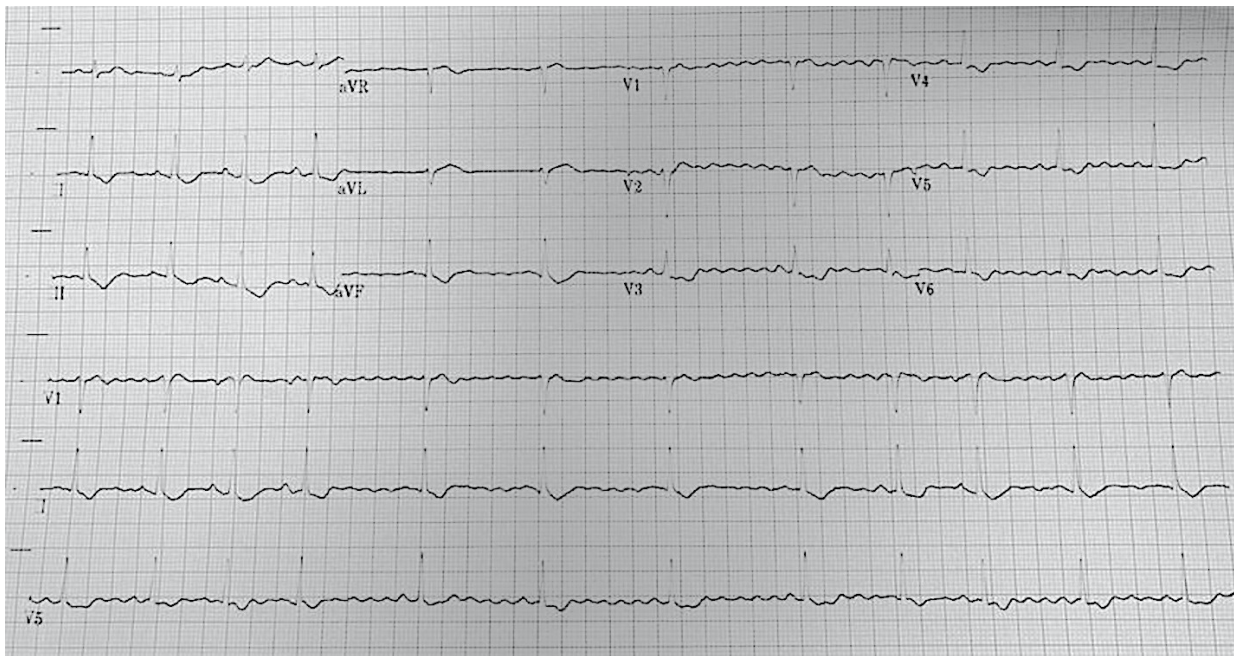


Fig. 1. The patient's ECG showing atrial tachycardia and digoxin effect. Note the down-sloping ST depression and the different P-wave morphologies.

pensed/not). All four pharmacies dispensed the medications without hesitancy, and without asking about the indication, prescription, or dosage.

## II. DISCUSSION

Cardioselective medication overdose requires public health attention. The abovementioned unfortunate case reveals the need for proactive policy reform. There is an urgent need to formulate a policy banning the dispensing of this group of drugs without prescription, and to monitor its implementation. It may be prudent to apply the same public policy initiative implemented in Saudi Arabia in 2018, regarding the sale of antibiotics without prescription, which was successful [18]. We believe the success of such policy is attributed to the multi-level approach applied in launching a public campaign enforced by fines and the threat of proceedings and license revocation. A similar process could be implemented here.

The attitude of the various pharmacists requires further examination. Those pharmacies' websites indicate that the medications in question are not dispensed without prescription; however, their dispensing attitude could not be judged in the absence of legislation.

We believe this case should trigger further investigation into drugs used for suicide, especially as self-prescription appears a common practice in the community [19, 20]. Although the prevalence of suicide in the community is not high, the impact of suicide using such medications is extreme [21]. We therefore believe this issue should receive equal attention to that given to antibiotic misuse.

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