

HKWC Toxicology Meeting

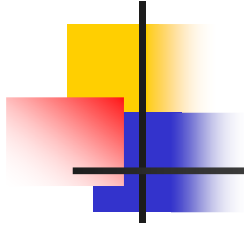
Dr. CK Wan

03/05/2012



Case presentation

- M/45
- PMH:
 - Alcohol abuse
 - Alcoholic cerebellar degeneration
 - Wernicke's encephalopathy



- Found vomiting at home by his wife at ~1pm
- Patient admitted that he had drunk half a bottle (~30-50ml) of red flower oil with alcohol few hours ago (exact time unknown)



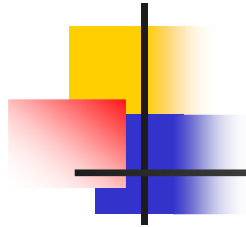
Table 7. Chinese Remedies That Have Produced Gastrointestinal Irritation Or Salicylate Poisoning.

Topicals

- Pak Far Oil (White Flower Oil)
- Hung Far Oil (Red Flower Oil)
- Tiger Balm
- Feng Yau Jing
- Tieh Ta Medicated Wine

Pills

- Yin Chiao Chieh Tu Pien
 - Niu Huang Chieh Tu Pien
 - Kaimusseï
-



-
- % of methylsalicylate unknown
 - Is this ingestion toxic?

Appendix I - Listed ingredients of some medicinal oil in Hong Kong at 2008

Medicinal Oil	Methyl salicylate	Other ingredients
正紅花油	60% - 75%	Cinnamon oil (肉桂油) Camphor (樟腦)
天元堂活絡油	45%	Camphor (樟腦) Menthol (薄荷腦) Eucalyptus (桉葉油) Turpentine oil (白松油/松節油) Liquid paraffin(石蠟油)
和興白花油	40%	Menthol (薄荷腦) Camphor (樟腦) Eucalyptus (桉葉油) Lavender (薰衣草油)
黃道益活絡油	35%	Menthol (薄荷腦) Camphor (樟腦) Turpentine oil (白松油/松節油)
正獅子油	30%	Camphor (樟腦) Menthol (薄荷腦) Turpentine oil (白松油/松節油)
和興活絡油	30%	Menthol (薄荷腦) Camphor (樟腦) Eucalyptus (桉葉油) Turpentine oil (白松油/松節油)
黑鬼油	28% - 30%	Camphor (樟腦) Citronella oil (香草油) Pine Oil (松油)
均隆驅風油	15%	Menthol (薄荷腦) Camphor (樟腦) Eucalyptus (桉葉油) Lavender (薰衣草油) Liquid paraffin(石蠟油)
健和堂舒筋活絡油	√	
虎標萬金油		Menthol (薄荷腦) Cinnamon oil (肉桂油) Camphor (樟腦) Peppermint (薄荷油) Liquid paraffin(石蠟油)
保心安油		Cinnamon oil (肉桂油) Peppermint (薄荷油)

√ contains methyl salicylate but not camphor or turpentine oil

Methylsalicylate dose

- 1ml 100% = 1.4g aspirin
- 1ml 60% = 0.84g aspirin
- 30ml 60% = 25200mg aspirin

- Assume BW 75kg
- i.e. 25200mg/75kg
- ~ 336mg/kg

~ 250 tabs of aspirin (100mg/tab)



Acute Ingestion	
< 150mg/kg	Non / minimally toxic
> 150mg/kg (mild)	Potential toxic
> 300mg/kg	Severe
> 500mg/kg	Life threatening



On arrival

- BP 167/96 P119 T 35.8 C
- GCS 15/15
- RR 18 SaO2 99% 2LO2
- “Herbal oil” smell +
- Sweating +
- Chest: clear
- CVS: tachycardia



Progress

- H'stix: 2.6
- ECG: Sinus tachycardia, 117/min, QRS 102ms, QTc 386ms
- Istat taken, result pending
- Blood x CBP, L/RFT, RG, PT/APTT, paracetamol, salicylate & ethanol level taken



Progress

- D50 40ml iv
- Thiamine 100mg imi
- NS
- AC 50g po



Progress

- i-stat:
 - pH 7.301
 - pO₂ 17.1 kPa
 - pCO₂ 4.03 kPa
 - BE -11 mmol/L
 - HCO₃ 14.9 mmol/L
 - Na 141 mmol/L, K 4.4mmol/L



Progress

- Patient became agitated and confused (pulled out all drips)
- RSI with dormicum & suxamethonium
- 8.4% NaHCO₃
- Sorbitol 50ml through NG tube



Progress

- Admitted to ICU
- Plan for HD through right femoral line
- Just before HD, patient developed pulseless VT → CPR + amiodarone → ROSC 4 mins later

pH 6.9, K 6.2



Progress

- Paracetamol level: < 66 $\mu\text{mol/L}$
- Salicylate > 5.8 mmol/L (80.56 mg/dL)
(ref. 1.4-1.8 mmol/L)
Later confirmed to be 7.2 mmol/L
- Ethanol 40 mmol/L

Pulseless VT, CPR, HD x 4hrs

HD X 4hrs

0200- 0600

Collect Date :	14/09/11	14/09/11	14/09/11	14/09/11	15/09/11		
Collect Time :	14:22	19:40	21:12	22:56	00:53		
Request No. :	C9143103	C9146006	C9156001	C9156003	C9156004	Ref. Range	Units
Remark :	DO.do.The drug overdose. overdose. overdose. overdose. overdose. confirmat Paracetam Paracetam Paracetam Paracetam ion:No, Su ol: ol: ol: ol:						

Paracetamol	<66	<66	<66	<66	<66	See Below	umol/L
Salicylate	>5.8 H	4.8 H	3.7 H	4.2 H	4.4 H	1.4 - 1.8	mmol/L
Ethanol	40 H	<3.0	<3.0	<3.0	<3.0	Toxic >33	mmol/L



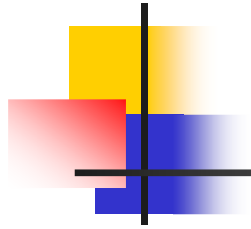
Progress

- On serum & urinary alkalinization
- MDAC
- Salicylate was on reducing trend



Outcome

- Extubated on the next day
- To general medical ward on D2
- d/c uneventfully



Salicylate poisoning



Pathophysiology

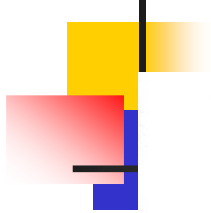
- GI irritation
- Direct stimulate respiratory centre
- Uncouple oxidative phosphorylation
- Inhibits dehydrogenase in Kreb's cycle
- Induced fatty acid metabolism



Clinical manifestation

CNS

- Tinnitus or hearing impairment
- Confusion, lethargy, coma, convulsion
- Cerebral edema
- GI - Vomiting
- Pulmonary – ALI
- CVS – Tachycardia
- Hyperthermia
- Sweating
- Hypokalemia
- Glucose



Ingestion of medicated oils by adults: the risk of severe salicylate poisoning is related to the packaging of these products

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Table 2 Clinical details of 24 subjects who had ingested medicated oils containing methyl salicylate


	<i>White Flower Oil</i>	<i>Red Flower Oil</i>
Men:women ratio	4:14	0:6
Age (years)	21 (15–74)	40 (26–86)
Ingestion–admission intervals (hours)	3.5 (1–9)*	3.3 (0.5–9.5) [†]
Amount ingested (mL)		
Not known	11 (61%)	2 (33%)
≤10	5 (28%)	1 (17%)
10–20	2 (11%)	1 (17%)
30–100	0	2 (33%)
Gastric lavage/activated charcoal	15 (83%)	4 (67%)
Plasma salicylate levels (mmol/L)		
0.1–1.0	12 (67%)	2 (33%)
1.1–2.1	5 (28%)	0
≥2.2	1 (5%) [‡]	4 (67%) [‡]
Severity of salicylate poisoning [§]		
No symptoms	7 (39%)	0
Mild symptoms	11 (61%)	3 (50%)
Moderate–severe symptoms	0 (0%) [#]	3 (50%) [#]
Duration of stay (days)	2 (1–4)	4 (2–15)
Outcome		
Home	17 (94%)	4 (67%)
Transfer to other units	1 (5%)	1 (17%)
Unrelated death	0	1 (17%)

Apart from 'White Flower Oil', two patients also took paracetamol or alcohol. Apart from 'Red Flower Oil', two patients also took paracetamol. *Data based on 15 subjects. [†]Data based on five subjects. [‡] $P=0.006$ by Fisher's exact test. [§]Included nausea, vomiting, epigastric pain, tinnitus, sweating, hyperventilation and respiratory alkalosis/metabolic acidosis. [#] $P=0.010$ by Fisher's exact test.

Table 1 Packaging of medicated oils containing methyl salicylate

	<i>White Flower Oil*</i>	<i>Red Flower Oil*</i>		
		<i>Brand 1</i>	<i>Brand 2</i>	<i>Brand 3</i>
Methyl salicylate (%)	40	67	30	50
Bottle size (mL)	2.5, 5, 10 and 20	60	26	30
Internal diameter of opening (mm)	3.04 [†]	11.44	4.65	3.89
Rate of emptying of content (mL/s) [‡]	0.15 [‡]	2.5	0.25	0.34

Data based on Ref. [5]. *There is only one manufacturer for 'White Flower Oil'. There are several manufacturers for 'Red Flower Oil', but only the data from 3 brands previously tested by us are shown here. [†]Based on the findings from one bottle size (20 mL). [‡]The bottles were tilted at 30° angle from the horizontal and the time needed to empty half of the content was noted.

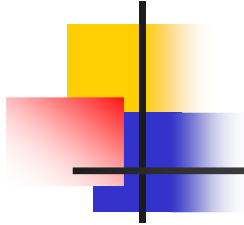


Ingestion of medicated oils by adults: the risk of severe salicylate poisoning is related to the packaging of these products

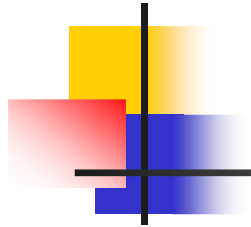
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To reduce the amount of methyl salicylate that can be readily swallowed...,
improvements are needed in the existing packaging of these products.



- **Improvements in the packaging of drugs and chemicals may reduce the likelihood of severe intentional poisonings in adults**
Human Exp Toxicol 2000; 19: 387-91



- Thank you!