Medical Kit at 8000m; Lessons learnt, time to update?

What to pack in a medical kit when on a high altitude expedition

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Background:

Mountain expeditions aiming to reach 'Extreme high altitude' are becoming increasingly popular and therefore accessible. The growth in this sector of adventure tourism has been accompanied by increasing numbers of expedition medics operating in this environment. There is very little specific information in the literature on compiling an expedition medical kit for these trips as we found when planning for an expedition on Broad Peak.

Most expedition medical texts [1] will contain suggestions of an approach; lists of factors to be considered when deciding on the actual contents of the kit. As this subspeciality grows, it would be useful to have an environment specific recommended medications list to aide future medics.

Methods

A literature search for full medical kits on an expedition with a doctor. 2 expeditions identified; 1992 winter expedition on Everest [2] , 2011 3 week expedition to Aconcagua and adjacent peaks [3]. We reviewed these against a British military expedition to Broad Peak 2022 (BSME20). The content of these medical kits were compared against medications recommended for a '6 week high altitude mountaineering expedition' in the 3rd edition Oxford Handbook of Expedition and Wilderness medicine (OEH) [1].

Results:

Demographics	OEH	Everest	Andean trinity	BSME 20
Population on expedition	20	55	8	27
Number of days of expedition	48	-	21	52
Expedition description	Generic 'High altitude'	Everest	Aconcagua	Broad peak

Table 1. Demographics will influence quantity of medication carried on high altitude expeditions.

Medication for altitude related illness Quantity each expedition carried	OEH	Everest	Andean trinity	BSME 20
Acetazolamide 250mg tablets	100	0	180	390
Acetazolamide 500mg tablets	0	750	0	0
Dexamethasone 2mg tablets	40	0	30	0
Dexamethasone 4mg tablets	0	0	0	58
Dexamethasone for injection 3.3mg/ml	5	0	5	24
Dexamethasone 5mg tablets	0	5	0	0
Nifedipine MR 10mg tablets	10	0	0	0
Nifedipine MR 20mg tablets	0	50	14	52

Table 2. The altitude related medication were similar for all but the doses varied.

Discussion:

Over 30% of the content of each medical kit was not on the suggested list in OEH. 70% of that recommended by the OEH was carried but often in a different dose or form. Interestingly, as shown in table 2, all expeditions carried medication to treat HACE and HAPE as suggested by OEH. However, the doses varied. This reflects the breadth of recent research into high altitude medications and variability in the literature [6].

Neither the Everest or Andean Trinity expedition carried Tranexamic acid. This is expected given the evidence base for tranexamic acid (TXA) was not present when the expeditions took place. BSME20 used TXA in a 'very seriously injured' trauma patient, likely to have significantly improved the outcome and therefore is a medication we would recommend to future expeditions to extreme high altitude [5].

BSME20 was the only expedition to carry diclofenac eye drops, tetracaine and fluorescein. It is our assertion that squinting due to pain has significant knock on effects on mobility and should, in this environment, be mitigated wherever possible. BSME20 also carried ondansetron melts. These have the benefit of being absorbed without transiting the stomach. Unlike buccastem (prochlorperazine) which has an onset time of 30-60 minutes and a bitter taste, ondansetron melts generally work in <30 mins and we found them to be better tolerated. They were the only medication we ran out of during the expedition.

Neither prior expedition or OEH included emergency contraception. Though neither were administered during BSME20, we would still recommend considering this addition on any expeditions with female members.

Conclusion:

Medications carried on extreme high altitude expeditions has not drastically changed over the last 30 years. They have adapted along with sea- level prescribing practices. The novel introduction to the medication armoury has been TXA[5].

Consideration of the most suitable anti-emetic, may steer away from current OEH recommendations. Content of medical kits should continue to be based on assessment of the patients, environment and medical evacuation plan.



References

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Further information:

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