A study of post-operative acute pain management comparing Tapentadol versus Oxycodone in a metropolitan Australian hospital

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Introduction

Tapentadol is frequently prescribed for acute post-operative pain despite limited evidence for this indication.[1, 2] Literature indicates that the efficacy of tapentadol is non-inferior to oxycodone for chronic pain.[1,2] Studies comparing the two analgesics in post-operative acute pain only exist for specific surgeries and include non-opioid naïve patients. Additionally, tapentadol is more costly as it lacks government subsidies for acute pain.[3] This creates complexities in continuity of pharmaceutical care, with little evidence of benefit for management of acute pain with tapentadol.

Aim

This preliminary study aims to compare the analgesic efficacy of tapentadol sustained and immediate release (SR and IR) to oxycodone (SR and IR) for post-operative acute pain in opioid naïve adults.

Methods

- A retrospective study of opioid naïve surgical patients admitted to three surgical wards at a tertiary hospital between September – December 2019.
- A patient list was generated using Discern Analytics II from electronic health records (EHR) - Cerner
- Total number of patients screened was 181, with 60 patients meeting the inclusion criteria.
- EHR were assessed using a an 11-point Numeric Pain Rating Scale (NPRS).

Figure 1: 11-point Numeric Pain Rating Scale

- Pain scores were assessed at various points in time (immediately post-surgery, at 24, 48 and 72-hours after surgery)

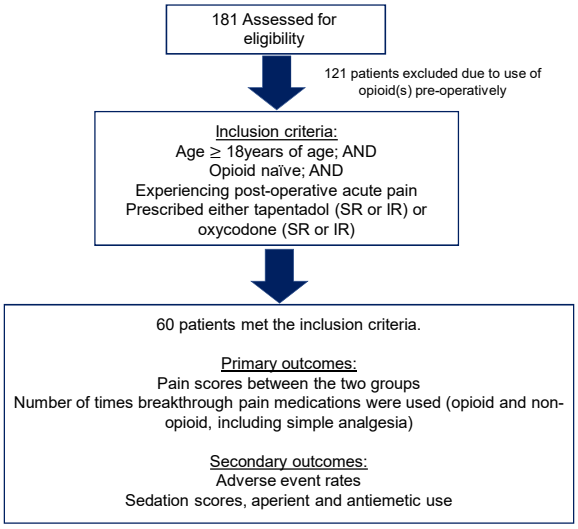

Figure 2: Patient selection and study outcomes

- Data analysis was performed using SPSS 25 and Microsoft Excel 2010 to obtain descriptive statistics. Pain scores were statistically analysed using Mann-Whitney U test and the Fisher exact test which compared the categorical variables

Results

Baseline demographics		Tapentadol group N = 16	Oxycodone group N=44	Total population N=60
Patient characteristics	Age (years)	69.4	52.5	56.97
	Males (%)	25.0	63.6	53.3
	Females (%)	75.0	36.3	46.7
	Length of stays (days)	6.2	6.7	6.5
Types of surgeries	Vascular	4 (25%)	8 (18.2)	12
	Gynaecological	1 (6.25%)	3 (6.8)	4
	Orthopaedic	6 (37.5%)	18 (40.9)	24
	Gastroenterological	5 (31.25)	15 (34.1)	20

Table 1: Baseline demographics and types of surgeries

Results continued

Primary outcome

Hours after surgery	Pain scores (mean)		
	Tapentadol SR group N=16	Oxycodone SR group N=44	*p*-value
0	4.8	5.6	0.26
24	4.2	4.3	0.94
48	3.8	3.7	0.89
72	1.9	2.8	0.14

Table 2: Pain scores for the tapentadol and oxycodone group at 0, 24, 48 and 72 hours

- The mean pain scores immediately post-surgery were 4.8 and 5.6 in tapentadol and oxycodone groups, respectively. The pain scores declined in both groups at 24 (4.2 versus 4.3), 48 (3.8 versus 3.7) and 72-hours (1.9 versus 2.8), but the differences were not statistically significant.
- The average number of "when required" analgesia doses were 11.7 versus 11 .0 in the tapentadol and oxycodone groups, respectively.
- The total average dose over three days of the oxycodone group is morphine equivalent to 75.5mg whilst the tapentadol group is 81.6mg. Morphine equivalence in both groups are similar and no statistically significance is observed (p=0.478).

Secondary outcome

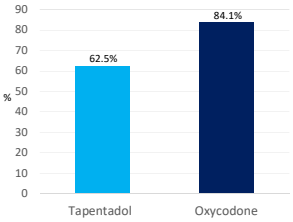

Figure 3: Percentage of patients experiencing GI adverse effects (%)

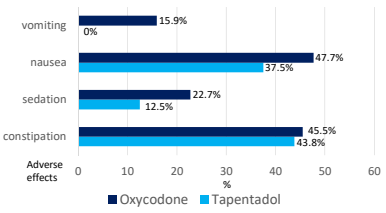

Figure 4: Percentage of patients experiencing other adverse effects (%)

- The secondary outcomes of patients experiencing adverse gastrointestinal (GI) and sedation effect were less frequent in the tapentadol group (62.5% versus 84.1%, *p= 0.088*).

Discussion

The results of this study are comparable to previous studies conducted for patients with chronic pain.[1, 2] Tapentadol did not significantly reduce pain scores compared with oxycodone. The mean change in pain scores from baseline to 72 hours post-surgery between the tapentadol and oxycodone group were 2.9 and 2.8 respectively. These results can be substantiated as the morphine equivalent in the oxycodone and tapentadol group are directly comparable as there is no statistical difference between the two. However, oxycodone may be prior selected for use in more complex surgeries.

Tapentadol demonstrated a better overall gastrointestinal tolerability profile. Incidences of vomiting affected 15.9% of individuals in the oxycodone group and did not affect the tapentadol group (0%). The proportion of patients experiencing constipation was similar between tapentadol and oxycodone group (43.8 versus 45.5%).

Limitations

The main limitation of the study is the size and the nature of a single-centre retrospective design. Thus, results may not be generalizable to other hospitals with different patient demographics.
In a retrospective study, the exposure or outcome assessment cannot be controlled, however, as the study site uses electronic health records this issue was unlikely to have contributed to the results.

In addition, the confounding effects of the patient's medical history, type of surgical procedure, gender and age are not adjusted for, thus the results of the study may not identify a difference in pain score.

Conclusion

The results of this small preliminary study suggest that tapentadol is non-inferior to oxycodone in efficacy of post-operative acute pain control in opioid naïve adults compared to oxycodone. A larger study involving a greater number of patients would be required to confirm the results. Tapentadol was associated with fewer adverse events, however, it comes at a great cost for the hospital and the patients. Another potential area for investigation is the analysis of the cost and benefit of potential better tolerability of tapentadol.

References
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3. Pharmaceutical Benefits Scheme (PBS) [Internet]. PBS. 2020 http://www.pbs.gov.au/medicine/item/10094G accessed 01/05/20

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