

Ocular injury associated with prone positioning in adult critical care: A systematic review and meta-analysis.

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Background and objectives:

Prone positioning has been shown to significantly improve outcomes in critical care patients with acute respiratory distress syndrome (ARDS) and is highly topical at present with the ongoing Covid-19 pandemic. Potentially avoidable complications are associated with this technique, including ocular injury and vision loss. This study conducts the first systematic review and meta-analysis of the ocular injuries reported in randomised controlled trials (RCTs) comparing supine versus prone positioning in adult critical care patients.

Results:

Eleven RCTs were included with study selection shown in figure 1. Including a total of 2,247 patients with 1,089 patients in the supine group and 1,158 patients randomised to undergo prone positioning. The incidence of eye injury was 1.12% and 1.19% in the prone and supine groups - reducing to 0.17% and 0.18%, respectively, with reports of eye (chemosis) or eyelid oedema removed given that this is often a transient finding associated with prone position. Meta-analysis demonstrated no significant difference between the supine and prone groups with (Figure 2a)- risk ratio (RR) 1.02 [95% confidence interval (CI) 0.82, 1.26] – or without (Figure 2b) patients with reported chemosis or eyelid oedema - RR 0.79 [CI 0.11, 5.44]. Sub-conjunctival haemorrhage was the only other ocular injury reported.

Paper	Ocular injury recorded	Injury type	Supine	Prone
Gattinoni, 2001	None recorded	-	-	-
Watanabe, 2002	Yes	Eyelid oedema	8	8
Beuret, 2002	None recorded	-	-	-
Guérin, 2004	None recorded	-	-	-
Papazian, 2005	None recorded	-	-	-
Voggenreiter, 2005	None recorded	-	-	-
Mancebo, 2006	Yes	Sub-conjunctival haemorrhage	2	2
Chan, 2007	Yes	Chemosis 'Eye swelling'	3	5
Fernandez, 2008	None recorded	-	-	-
Taccone, 2009	None recorded	-	-	-
Guérin, 2013	None recorded	-	-	-

Table 1. Ocular injuries recorded in each of the included studies.

Discussion:

A large study by Yu et al in 2010 examined the rates of ocular injury with prone positioning in general anaesthesia. Here they found a 0.023% incidence of peri-operative ocular injury rising to 0.08% in the prone position group. This was found to be a significant difference with OR 10.8. However on the whole the incidence in general anaesthesia is still lower than that in critical care which may be attributed to longer time in prone position and hypocoagulable states.

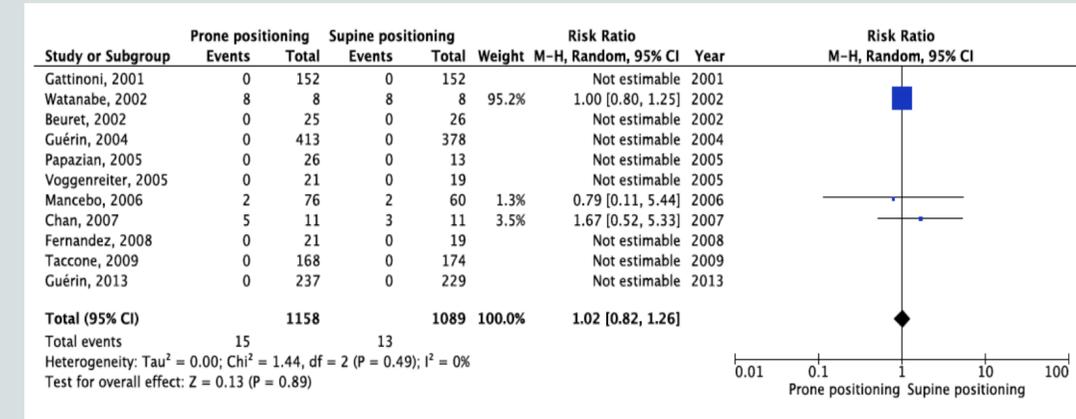


Figure 2a. Forrest plot analysis of all ocular injuries recorded across the study populations. There was a non-significant difference shown between groups. Risk ratio 1.02 [CI 0.82, 1.26].

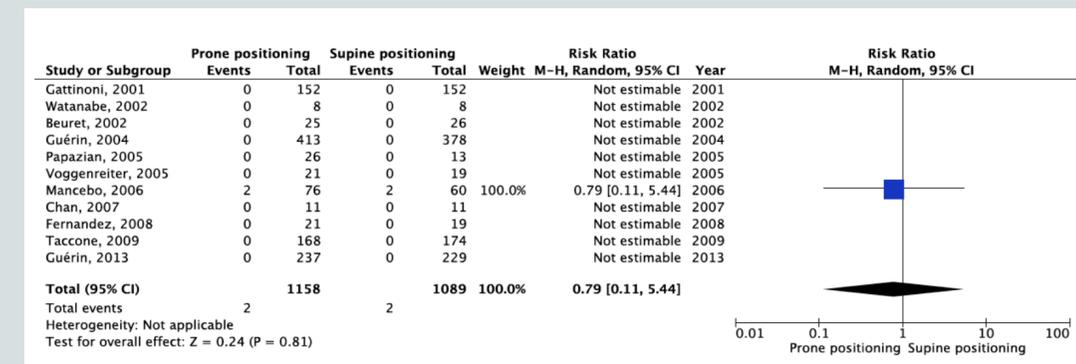


Figure 2b. Forrest plot analysis of all ocular injuries, excluding eye/eyelid swelling. There was a non-significant difference shown between groups. Risk ratio 0.79 [CI 0.11, 5.44].

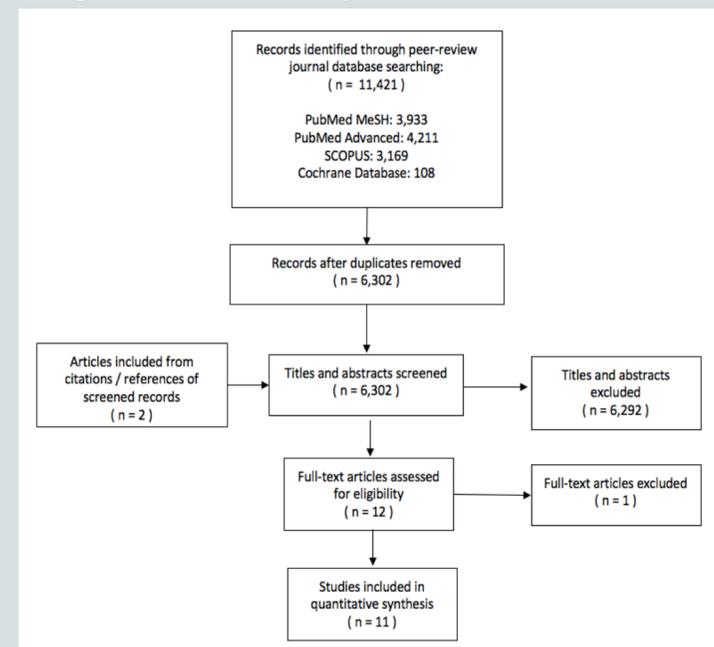


Figure 1. Website Selection Flow Chart

Methods:

A systematic review and meta-analysis was carried out in accordance with PRISMA guidelines. PubMed, SCOPUS and the Cochrane Library were searched with the terms “prone” and “position”. The search period was 1st January 1990 till 1st July 2020. This review was registered with PROSPERO: CRD42020196917.

Conclusions:

This meta-analysis showed that there was no significant difference in the rate of ocular injury between prone and supine patient groups in adult critical care. Compared to prone position in general anaesthesia, an increased incidence was displayed in the prone critical care (0.17% vs. 0.08%) group. The authors recommend that this data be used to guide future critical care follow-up services.