

Questions Asked of the Consensus Working Group

Severe TBI Informed by ICP Measurements

Survey 1:

1. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, endotracheal intubation and mechanical ventilation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	87.50% 35
A first-level treatment	7.50% 3
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	5.00% 2
Preferred but not necessary	0.00% 0
TOTAL	40

2. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, sedation to prevent agitation, ventilator asynchrony, etc. (and not specifically for treatment of ICP elevation) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	79.49% 31
A first-level treatment	15.38% 6
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	2.56% 1
Preferred but not necessary	2.56% 1
TOTAL	39

3. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, analgesia to manage signs of pain (and not specifically for treatment of ICP elevation) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	74.36% 29
A first-level treatment	20.51% 8
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	0.00% 0
Preferred but not necessary	5.13% 2
TOTAL	39

4. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, elevation of the head of the bed to 30-45° should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	82.50% 33
A first-level treatment	15.00% 6
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	0.00% 0
Preferred but not necessary	2.50% 1
TOTAL	40

5. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, ensuring that venous return from the head is optimized by keeping the head midline and ensuring a cervical collar is not compressive should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	82.50% 33
A first-level treatment	15.00% 6
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	0.00% 0
Preferred but not necessary	2.50% 1
TOTAL	40

6. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, central venous access should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	47.50% 19
A first-level treatment	20.00% 8
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	20.00% 8
Preferred but not necessary	12.50% 5
TOTAL	40

7. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, blood pressure monitoring via an indwelling arterial line should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	67.50% 27
A first-level treatment	17.50% 7
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	5.00% 2
Preferred but not necessary	10.00% 4
TOTAL	40

8. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, end-tidal CO2 monitoring should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	67.50% 27
A first-level treatment	10.00% 4
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	7.50% 3
Preferred but not necessary	15.00% 6
TOTAL	40

9. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, temperature management to prevent fever or hypothermia should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	67.50% 27
A first-level treatment	32.50% 13
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	0.00% 0
Optional and not necessary	0.00% 0
Preferred but not necessary	0.00% 0
TOTAL	

10. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, electronic pupillary monitoring (or pupillometry) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	20.00% 8
A first-level treatment	10.00% 4
A second-level (intermediate) treatment	5.00% 2
A third-level (last resort) treatment	0.00% 0
Not used	7.50% 3
Optional and not necessary	27.50% 11
Preferred but not necessary	30.00% 12
TOTAL	40

11. Based upon the current status of the literature is it appropriate to conceptualize and administer mannitol as low dose ($\leq 1\text{g/kg}$) and high dose ($\geq 1\text{g/kg}$)?

Answer Choices	Responses
Yes	65.71% 23
No	34.29% 12
TOTAL	35

12. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, low dose mannitol ($\leq 1\text{g/kg}$) by bolus/rapid infusion in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.56% 1
A first-level treatment	58.97% 23
A second-level (intermediate) treatment	25.64% 10
A third-level (last resort) treatment	0.00% 0
Not used	10.26% 4
Optional and not necessary	2.56% 1
Preferred but not necessary	0.00% 0
TOTAL	39

13. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, high dose mannitol ($\geq 1\text{g/kg}$) by bolus/rapid infusion in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	5.13% 2
A first-level treatment	23.08% 9
A second-level (intermediate) treatment	51.28% 20
A third-level (last resort) treatment	2.56% 1
Not used	17.95% 7
Optional and not necessary	0.00% 0
Preferred but not necessary	0.00% 0
TOTAL	39

14. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, mannitol by scheduled infusion (e.g. every 4-6 hrs) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	17.50% 7
A second-level (intermediate) treatment	7.50% 3
A third-level (last resort) treatment	0.00% 0
Not used	55.00% 22
Optional and not necessary	15.00% 6
Preferred but not necessary	2.50% 1
TOTAL	40

15. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, mannitol by non-bolus continuous intravenous infusion should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	5.00% 2
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	0.00% 0
Not used	87.50% 35
Optional and not necessary	5.00% 2
Preferred but not necessary	0.00% 0
TOTAL	40

16. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, 3% hypertonic saline by bolus/rapid infusion injection in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	50.00% 20
A second-level (intermediate) treatment	25.00% 10
A third-level (last resort) treatment	0.00% 0
Not used	7.50% 3
Optional and not necessary	12.50% 5
Preferred but not necessary	2.50% 1
TOTAL	40

17. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, 23.4% hypertonic saline by bolus/rapid infusion injection through a central line in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.56% 1
A first-level treatment	25.64% 10
A second-level (intermediate) treatment	35.90% 14
A third-level (last resort) treatment	5.13% 2
Not used	17.95% 7
Optional and not necessary	12.82% 5
Preferred but not necessary	0.00% 0
TOTAL	39

18. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, 3% hypertonic saline by scheduled infusion (e.g. every 4-6 hrs) in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	20.00% 8
A second-level (intermediate) treatment	20.00% 8
A third-level (last resort) treatment	0.00% 0
Not used	37.50% 15
Optional and not necessary	20.00% 8
Preferred but not necessary	0.00% 0
TOTAL	40

19. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, 3% hypertonic saline by scheduled infusion (e.g. every 4-6 hrs) in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.56% 1
A first-level treatment	17.95% 7
A second-level (intermediate) treatment	17.95% 7
A third-level (last resort) treatment	0.00% 0
Not used	41.03% 16
Optional and not necessary	20.51% 8
Preferred but not necessary	0.00% 0
TOTAL	39

20. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, hypertonic saline by non-bolus continuous infusion in response to ICP elevation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	5.00% 2
A first-level treatment	5.00% 2
A second-level (intermediate) treatment	22.50% 9
A third-level (last resort) treatment	0.00% 0
Not used	47.50% 19
Optional and not necessary	17.50% 7
Preferred but not necessary	2.50% 1
TOTAL	40

21. With respect to severe TBI, do you think it is appropriate to conceptualize hyperventilation as moderate hyperventilation (e.g. PaCO_2 of 30-35 mm Hg/4.0-4.6 kPa) and severe hyperventilation ($\text{PaCO}_2 < 30$ mm Hg/4.0 kPa)?

Answer Choices Responses	
Yes	86.84% 33
No	13.16% 5
TOTAL	38

22. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, maintaining PaCO_2 at low end of normal (35-38 mm Hg/4.6-5.0 kPa) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	42.11% 16
A first-level treatment	42.11% 16
A second-level (intermediate) treatment	2.63% 1
A third-level (last resort) treatment	2.63% 1
Not used	7.89% 3
Optional and not necessary	2.63% 1
Preferred but not necessary	0.00% 0
TOTAL	38

23. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, moderate hyperventilation (e.g. 30-35 mm Hg/4.0-4.6 kPa) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	5.00% 2
A first-level treatment	25.00% 10
A second-level (intermediate) treatment	47.50% 19
A third-level (last resort) treatment	7.50% 3
Not used	10.00% 4
Optional and not necessary	5.00% 2
Preferred but not necessary	0.00% 0
TOTAL	40

24. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, severe hyperventilation to below 30 mm Hg/4.0 kPa) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	0.00% 0
A first-level treatment	2.56% 1
A second-level (intermediate) treatment	17.95% 7
A third-level (last resort) treatment	38.46% 15
Not used	38.46% 15
Optional and not necessary	2.56% 1
Preferred but not necessary	0.00% 0
TOTAL	39

25. Do you feel that moderate hyperventilation (e.g. 30-35 mm Hg/4.0-4.6 kPa) requires adjunctive monitoring to ensure safety (ie. brain oxygen monitoring)?

Answer ChoicesResponses	
Yes	65.00% 26
No	35.00% 14
TOTAL	40

26. Do you feel that severe hyperventilation to below 30 mm Hg/4.0 kPa requires adjunctive monitoring to ensure safety (ie. brain oxygen monitoring)?

Answer ChoicesResponses	
Yes	91.67% 33
No	8.33% 3
TOTAL	36

27. With respect to severe TBI, do you think it is appropriate to conceptualize hypothermia as mild (35-37.0°C) versus moderate ($\leq 35^{\circ}\text{C}$)?

Answer ChoicesResponses	
Yes	92.31% 36
No	7.69% 3
TOTAL	39

28. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, mild hypothermia (e.g. 35-37.0°C) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	20.00% 8
A second-level (intermediate) treatment	40.00% 16
A third-level (last resort) treatment	22.50% 9
Not used	10.00% 4
Optional and not necessary	5.00% 2
Preferred but not necessary	0.00% 0
TOTAL	40

29. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, moderate hypothermia (e.g. $\leq 35^{\circ}\text{C}$) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	0.00% 0
A first-level treatment	5.13% 2
A second-level (intermediate) treatment	20.51% 8
A third-level (last resort) treatment	28.21% 11
Not used	35.90% 14
Optional and not necessary	10.26% 4
Preferred but not necessary	0.00% 0
TOTAL	39

30. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, indomethacin to treat fever should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	15.00% 6
A first-level treatment	17.50% 7
A second-level (intermediate) treatment	7.50% 3
A third-level (last resort) treatment	0.00% 0
Not used	25.00% 10
Optional and not necessary	32.50% 13
Preferred but not necessary	2.50% 1
TOTAL	40

31. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, high-dose pentobarbital ("barb coma") to achieve burst suppression should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	0.00% 0
A first-level treatment	2.50% 1
A second-level (intermediate) treatment	0.00% 0
A third-level (last resort) treatment	87.50% 35
Not used	5.00% 2
Optional and not necessary	2.50% 1
Preferred but not necessary	2.50% 1
TOTAL	40

32. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, high-dose propofol (“propofol coma”) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	5.00% 2
A second-level (intermediate) treatment	17.50% 7
A third-level (last resort) treatment	45.00% 18
Not used	22.50% 9
Optional and not necessary	7.50% 3
Preferred but not necessary	0.00% 0
TOTAL	40

33. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, decompressive craniectomy should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	0.00% 0
A first-level treatment	5.00% 2
A second-level (intermediate) treatment	17.50% 7
A third-level (last resort) treatment	77.50% 31
Not used	0.00% 0
Optional and not necessary	0.00% 0
Preferred but not necessary	0.00% 0
TOTAL	40

34. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, increasing analgesia to lower ICP should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	7.50% 3
A first-level treatment	50.00% 20
A second-level (intermediate) treatment	30.00% 12
A third-level (last resort) treatment	0.00% 0
Not used	10.00% 4
Optional and not necessary	2.50% 1
Preferred but not necessary	0.00% 0
TOTAL	40

35. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, increasing sedation to lower ICP should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	7.50% 3
A first-level treatment	55.00% 22
A second-level (intermediate) treatment	27.50% 11
A third-level (last resort) treatment	2.50% 1
Not used	0.00% 0
Optional and not necessary	7.50% 3
Preferred but not necessary	0.00% 0
TOTAL	40

36. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, intermittent external CSF drainage (open to drainage when a set threshold is exceeded) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	10.00% 4
A first-level treatment	57.50% 23
A second-level (intermediate) treatment	17.50% 7
A third-level (last resort) treatment	0.00% 0
Not used	5.00% 2
Optional and not necessary	5.00% 2
Preferred but not necessary	5.00% 2
TOTAL	40

37. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, continuous external CSF drainage (drained against a gradient/closed intermittently for ICP measurement) should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	7.50% 3
A first-level treatment	35.00% 14
A second-level (intermediate) treatment	27.50% 11
A third-level (last resort) treatment	0.00% 0
Not used	15.00% 6
Optional and not necessary	12.50% 5
Preferred but not necessary	2.50% 1
TOTAL	40

38. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, raising CPP to lower ICP via intact pressure autoregulation should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	7.50% 3
A first-level treatment	35.00% 14
A second-level (intermediate) treatment	35.00% 14
A third-level (last resort) treatment	5.00% 2
Not used	7.50% 3
Optional and not necessary	10.00% 4
Preferred but not necessary	0.00% 0
TOTAL	40

39. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, neuromuscular blockade to treat ICP should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	5.00% 2
A first-level treatment	7.50% 3
A second-level (intermediate) treatment	47.50% 19
A third-level (last resort) treatment	25.00% 10
Not used	10.00% 4
Optional and not necessary	5.00% 2
Preferred but not necessary	0.00% 0
TOTAL	40

40. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, lumbar CSF diversion should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	0.00% 0
A first-level treatment	2.50% 1
A second-level (intermediate) treatment	2.50% 1
A third-level (last resort) treatment	12.50% 5
Not used	57.50% 23
Optional and not necessary	25.00% 10
Preferred but not necessary	0.00% 0
TOTAL	40

41. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, furosemide to treat ICP should be:

Answer Choices	Responses
A zero level treatment -- basic to sTBI care in ICU	2.50% 1
A first-level treatment	2.50% 1
A second-level (intermediate) treatment	15.00% 6
A third-level (last resort) treatment	2.50% 1
Not used	50.00% 20
Optional and not necessary	25.00% 10
Preferred but not necessary	2.50% 1
TOTAL	40

42. For a STBI patient with normal serum osmolality/tonicity and a normal serum sodium level, my hyperosmotic agent of choice is

Answer Choices	Responses
Mannitol	10.00% 4
Hypertonic saline	55.00% 22
Either (don't feel strongly either way)	35.00% 14
TOTAL	40

43. Do you believe there are particular circumstances where one hyperosmotic agent should be used preferentially?

Answer Choices	Responses
Yes	76.92% 30
No	23.08% 9
TOTAL	39

44. In a patient who is stable a "sedation holiday" (withholding sedation to allow a neurological examination) should be performed:

Answer Choices	Responses
Once a day, every day from the first post-injury day	16.13% 5
Once a day, every day, starting at 48 hours post-injury	19.35% 6
Once a shift, every day from the first post-injury day	51.61% 16
Once a shift, every day, starting at 48 hours post-injury	0.00% 0
Once a day, every day starting at ≥ 72 hours post-injury	6.45% 2
Once a shift, every day starting at ≥ 72 hours post-injury	6.45% 2
TOTAL	31

45. Relative contraindications to a “sedation holiday” test (when it should be performed only with caution and close observation) include (select all that are true):

Answer Choices	Responses
Earlier than 24 hours after injury	26.32% 10
Earlier than 48 hours after injury	23.68% 9
A worsening neurological examination	60.53% 23
Abnormal pupillary exam, unchanged since admission	34.21% 13
New onset of abnormal pupillary exam	55.26% 21
Stable GCS motor score of 1-3 (no response, decorticate or decerebrate posturing)	18.42% 7
Stable GCS motor score of 4 (withdrawing to pain, not localizing or following commands)	5.26% 2
A worsening neurological examination	57.89% 22
A stable repeat CT with compressed cisterns (Marshall DI III)	28.95% 11
A stable repeat CT with midline shift < 5 mm	7.89% 3
A stable repeat CT with midline shift ≥ 5 mm (Marshall DI IV or with a mass lesion)	34.21% 13
A repeat CT showing worsening of any type	50.00% 19
A “wake-up” test is necessary every day, no matter what	15.79% 6
Ongoing elevation of ICP	73.68% 28
Need to treat ICP within the last 24h	31.58% 12
Other (please specify)	18.42% 7

Total Respondents: 38

46. Absolute contraindications to a “sedation holiday” test (when it should be performed only with caution and close observation) include (select all that are true):

Answer Choices	Responses
Earlier than 24 hours after injury	16.67% 6
Earlier than 48 hours after injury	13.89% 5
A worsening neurological examination	50.00% 18
Abnormal pupillary exam, unchanged since admission	8.33% 3
New onset of abnormal pupillary exam	50.00% 18
Stable GCS motor score of 1-3 (no response, decorticate or decerebrate posturing)	11.11% 4
Stable GCS motor score of 4 (withdrawing to pain, not localizing or following commands)	2.78% 1
A worsening neurological examination	44.44% 16
A stable repeat CT with compressed cisterns (Marshall DI III)	13.89% 5
A stable repeat CT with midline shift < 5 mm	2.78% 1
A stable repeat CT with midline shift \geq 5 mm (Marshall DI IV or with a mass lesion)	30.56% 11
A repeat CT showing worsening of any type	33.33% 12
A “wake-up” test is necessary every day, no matter what	11.11% 4
Ongoing elevation of ICP	66.67% 24
Need to treat ICP within the last 24h	11.11% 4
Other (please specify)	36.11% 13

Total Respondents: 36

47. A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, for the first 24-48 hours, the “default” CPP target should be:

Answer Choices	Responses
50 mm Hg	5.00% 2
60 mm Hg	67.50% 27
70 mm Hg	15.00% 6
Other, please specify	12.50% 5
TOTAL	40

48. In general, in an “uncomplicated” patient, to consider removing an ICP monitor, ICP should be stable and acceptable without treatment for:

Answer Choices	Responses
24 hours	48.65% 18
48 hours	35.14% 13
72 hours	8.11% 3
> 72 hours	8.11% 3
TOTAL	37

49. The threshold temperature (temperature that triggers cooling) that should be used for normothermia/euthermia in an sTBI patient is:

Answer Choices	Responses
36.5°	12.50% 5
37.0°	15.00% 6
37.5°	30.00% 12
38.0°	32.50% 13
Other (please specify)	10.00% 4
TOTAL	40

50. The threshold temperature (temperature that triggers warming) that should be used for hypothermia in an sTBI patient is:

Answer Choices	Responses
34.0°	15.79% 6
35.0°	60.53% 23
36.0°	7.89% 3
36.5°	5.26% 2
Other (please specify)	10.53% 4
TOTAL	38

51. The SaO2 threshold that should be initially set for sTBI patients is:

Answer Choices	Responses
90%	17.95% 7
92%	12.82% 5
94%	20.51% 8
95%	35.90% 14
Other (please specify)	12.82% 5
TOTAL	39

52. The initial haematocrit/haemoglobin threshold for transfusion in a stable sTBI patient without evidence cerebral ischemia or ischemia of other organs should be:

Answer Choices	Responses
21%/7 g/dl	64.10% 25
30%/10 g/dl	28.21% 11
Other (please specify)	7.69% 3
TOTAL	39

Survey 2:

1. See Figure 1. A severe TBI patient, for whom there is enough concern about the development of intracranial hypertension to warrant an ICP monitor, is being admitted to ICU. In this instance sedation to prevent agitation, ventilator asynchrony, etc. (and not specifically for treatment of ICP elevation) should be a:

Answer Choices	Responses
Zero level treatment (basic to sTBI care in ICU)	94.59% 35
First level treatment (basic response to ICP elevation)	0.00% 0
I do not feel that this is a zero or first level treatment	5.41% 2
TOTAL	37

2. See Figure 2. A severe TBI patient, for whom there is enough concern about the development of intracranial hypertension to warrant an ICP monitor, is being admitted to ICU. In this instance, analgesia to manage signs of pain (and not specifically for treatment of ICP elevation) should be a:

Answer Choices	Responses
Zero level treatment (basic to sTBI care in ICU)	97.30% 36
First level treatment (basic response to ICP elevation)	2.70% 1
I do not feel that this is a zero or first level treatment.	0.00% 0
TOTAL	37

3. See Figure 3. In patients with a severe TBI, placement of a central line upon admission to the ICU is (irrespective of ICP values):

Answer Choices	Responses
A Standard of Care	48.65% 18
Recommended	29.73% 11
Optional	21.62% 8
TOTAL	37

4. See Figure 3. In patients with a severe TBI, requiring treatment for ICP elevation, placement of a central line upon admission to the ICU is (irrespective of ICP values):

Answer Choices	Responses
A Standard of Care	62.16% 23
Recommended	29.73% 11
Optional	8.11% 3
TOTAL	37

5. See Figure 3. In patients with a severe TBI, placement of a central line is a Zero Level intervention (basic to sTBI care in ICU)

Answer Choices	Responses
Agree	72.97% 27
Disagree	27.03% 10
TOTAL	37

6. See Figure 4. In patients with a severe TBI, placement of an indwelling arterial line for continuous blood pressure measurement upon admission to the ICU is (irrespective of ICP values):

Answer Choices	Responses
A Standard of Care	72.97% 27
Recommended	21.62% 8
Optional	5.41% 2
TOTAL	37

7. See Figure 4. In patients with a severe TBI, requiring treatment for ICP elevation, presence of an indwelling arterial line for continuous blood pressure measurement is:

Answer Choices	Responses
A Standard of Care	78.38% 29
Recommended	21.62% 8
Optional	0.00% 0
TOTAL	37

8. See Figure 4. In patients with a severe TBI presence of an indwelling arterial line for continuous blood pressure measurement is a Zero Level intervention (basic to sTBI care in ICU):

Answer Choices	Responses
Agree	83.78% 31
Disagree	16.22% 6
TOTAL	37

9. See Figure 5. In patients with a severe TBI, end-tidal CO2 monitoring upon admission the the ICU is (irrespective of ICP values):

Answer Choices	Responses
A standard of care	67.57% 25
Recommended	24.32% 9
Optional	8.11% 3
TOTAL	37

10. See Figure 5. In patients with a severe TBI requiring treatment for ICP elevation, end-tidal CO2 monitoring is:

Answer Choices	Responses
A standard of care	78.38% 29
Recommended	18.92% 7
Optional	2.70% 1
TOTAL	37

11. See Figure 5. In patients with a severe TBI, end-tidal CO2 monitoring is a Zero Level intervention (basic to sTBI care in ICU):

Answer Choices	Responses
Agree	86.11% 31
Disagree	13.89% 5
TOTAL	36

12. See Figure 6. A severe TBI patient, for whom there is enough concern about the development of intracranial hypertension to warrant an ICP monitor, is being admitted to ICU. In this instance, temperature management to prevent fever should be a:

Answer Choices	Responses
Zero level treatment (basic to TBI care in ICU)	75.00% 27
First level treatment (basic response to ICP elevation)	19.44% 7
I do not feel that this is a zero or first level intervention	5.56% 2
TOTAL	36

13. With respect to hyperventilation:

Answer Choices	Responses
Hyperventilation only has a role as a temporizing therapy in a neurological emergency (ie. herniation events)	62.16% 23
Hyperventilation has a role in the ongoing management of post traumatic ICP elevation in addition to its role as temporizing therapy.	37.84% 14
TOTAL	37

14. See Figure 7. A severe TBI patient, for whom there is enough concern about the development of intracranial hypertension to warrant an ICP monitor, is being admitted to ICU. In this instance, maintaining PaCO₂ at low end of normal (35-38mm Hg/4.6-5.0 kPa) should be a:

Answer Choices	Responses
Zero level treatment (basic to TBI care in ICU)	51.35% 19
First level treatment (basic response to ICP elevation)	32.43% 12
I do not feel either level treatment is required.	16.22% 6
TOTAL	37

15. See Figure 8. Given the displayed result from the first survey, please vote on whether the current status of the literature supports conceptualization of the administration of mannitol as low dose ($\leq 1\text{g/kg}$) and high dose ($>1\text{g/kg}$)?

Answer Choices	Responses
Agree	61.11% 22
Disagree	38.89% 14
TOTAL	36

16. A patient has an episode of elevated ICP for which treatment is felt indicated. In this instance, bolus treatment with a hypertonic solution (mannitol OR saline) in response to ICP elevation should be:

Answer Choices	Responses
A first-level treatment - basic response to ICP elevation	78.38% 29
An intermediate (second-level) treatment	21.62% 8
A treatment of last resort (third-level) treatment	0.00% 0
Not used	0.00% 0
TOTAL	37

17. A patient has an episode of elevated ICP for which treatment is felt indicated. If a bolus of hypertonic solution is chosen as the treatment, and mannitol is chosen as the agent, the dose should be:

Answer Choices	Responses
Low dose mannitol ($\leq 1\text{g/kg}$)	72.22% 26
High dose mannitol ($> 1\text{g/kg}$)	11.11% 4
Dosage does not matter	16.67% 6
TOTAL	36

18. As opposed to low dose mannitol ($\leq 1\text{g/kg}$), high dose mannitol ($\geq 1\text{g/kg}$) by bolus administration should be reserved for selected instances of very high ICP or ICP that has not responded to the lower dose:

Answer Choices	Responses
Agree	61.11% 22
Disagree	38.89% 14
TOTAL	36

19. A patient has an episode of elevated ICP for which treatment is felt indicated. The patient has a central line in situ. If a bolus of hypertonic solution is chosen as the treatment, and hypertonic saline is chosen as the agent, the initial concentration (first use in that patient) should be:

Answer Choices	Responses
3% hypertonic saline	43.24% 16
23.4% hypertonic saline	8.11% 3
The concentration does not matter because the osmoles delivered are typically equivalent	32.43% 12
Other concentration of hypertonic saline (please specify in comment section)	16.22% 6
TOTAL	37

20. A patient has an episode of elevated ICP for which treatment is felt indicated. The patient has a central line. As opposed to 3% saline, 23.4% by bolus administration should be reserved for selected instances of very high ICP or ICP that has not responded to the lower dose:

Answer Choices	Responses
Agree	36.11% 13
Disagree	33.33% 12
Does not matter because the osmoles delivered are typically equivalent	30.56% 11
TOTAL	36

21. See Figure 9. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, low dose mannitol ($\leq 1\text{g/kg}$) by bolus/rapid infusion in response to ICP elevation should be:

Answer Choices	Responses
First level treatment (basic response to ICP elevant)	70.27% 26
Second level treatment	18.92% 7
Not used	10.81% 4
TOTAL	37

22. See Figure 10. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, high dose mannitol (>1g/kg) by bolus/rapid infusion in response to ICP elevation should be:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	16.67% 6
Second level treatment	58.33% 21
Not used	25.00% 9
TOTAL	36

23. See Figure 11. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, mannitol administration by scheduled infusion in response to ICP elevation (eg. every 4-6h) should be a:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	8.33% 3
Second level treatment	19.44% 7
Not used	72.22% 26
TOTAL	36

24. See Figure 12. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, 3% hypertonic saline by bolus/rapid infusion in response to ICP elevation should be a:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	67.57% 25
Second level treatment	21.62% 8
Not used	10.81% 4
TOTAL	37

25. See Figure 13. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, 23.4% hypertonic saline by bolus/rapid infusion through a central line in response to ICP elevation should be a:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	32.43% 12
Second level treatment	51.35% 19
Not used	16.22% 6
TOTAL	37

26. See Figure 14. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, 3% hypertonic saline by scheduled infusion (eg. every 4-6h) in response to ICP elevation should be:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	11.11% 4
Second level treatment	27.78% 10
Not used	61.11% 22
TOTAL	36

[Comments\(7\)](#)

27. See Figure 15. A severe TBI patient has elevated ICP for which treatment is felt indicated. In this instance, hypertonic saline by non-bolus continuous infusion in response to ICP elevation should be:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	13.89% 5
Second level treatment	30.56% 11
Not used	55.56% 20
TOTAL	36

28. See Figure 16. Given the result from the previous survey, please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, mild hypothermia (e.g. 35-36°C) should be

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	2.70% 1
Second level treatment	54.05% 20
Third level treatment (treatment of last resort)	29.73% 11
None of the above	13.51% 5
TOTAL	37

29. See Figure 17. Given the result from the previous survey, please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance moderate hypothermia (<35°C) to treat ICP elevation following severe TBI is a:

Answer Choices	Responses
Second level treatment	5.56% 2
Third level treatment (treatment of last resort)	50.00% 18
Not used	44.44% 16
None of the above	0.00% 0
TOTAL	36

30. See Figure 18. Given the result from the previous survey, please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, increasing the analgesia dose to lower ICP following severe TBI is a:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	64.86% 24
Second level treatment	16.22% 6
Third level treatment (treatment of last resort)	2.70% 1
None of the above	16.22% 6
TOTAL	37

31. See Figure 19. Given the result from the previous survey (Item #41), please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, increasing the sedation dose to lower ICP following severe TBI is a:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	72.97% 27
Second level treatment	21.62% 8
Third level treatment (treatment of last resort)	0.00% 0
None of the above	5.41% 2
TOTAL	37

32. See Figure 20. Given the result from the previous survey, please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, using neuromuscular blockade to lower elevated ICP following severe TBI is a:

Answer Choices	Responses
Second level treatment	52.78% 19
Third level treatment (treatment of last resort)	38.89% 14
None of the above	8.33% 3
TOTAL	36

33. See Figure 21. Please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, using lumbar CSF drainage to lower elevated ICP following severe TBI:

Answer Choices	Responses
Has a role in management of ICP elevation following severe TBI	28.57% 10
Should not be used	71.43% 25
TOTAL	35

34. See Figure 22. Given the result from the previous survey, please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, using furosemide to lower elevated ICP following severe TBI:

Answer Choices	Responses
Has a role in management of ICP elevation following severe TBI	24.32% 9
Should not be used	75.68% 28
TOTAL	37

35. See Figure 23. Given the result from the previous survey, please vote again on the temperature below which warming should be initiated in a severe TBI patient

Answer Choices	Responses
34°C	17.14% 6
35°C	65.71% 23
Other, please specify in comment field	17.14% 6
TOTAL	35

36. See Figure 24. Please vote on the hemoglobin threshold below which you would always choose to transfuse a severe TBI patient without evidence of cerebral ischemia or ischemia of other organs:

Answer Choices	Responses
6 g/dL	8.33% 3
7 g/dL	72.22% 26
8 g/dL	11.11% 4
9 g/dL	5.56% 2
10g/dL	2.78% 1
TOTAL	36

37. See Figure 25. Please choose amongst the following options for a severe TBI patient with elevated ICP for which treatment is felt indicated. In this instance, a secondary decompressive craniectomy (in contrast to a primary decompressive craniectomy performed at the time of evacuation of an intracranial hematoma) to lower elevated ICP following severe TBI is a:

Answer Choices	Responses
Second level treatment	16.22% 6
Third level treatment (treatment of last resort)	81.08% 30
None of the above	2.70% 1
TOTAL	37

38. See Figure 26. All things being equal, with no contraindications to either agent and no confounding factors (e.g. hyperchloraemia, abnormal serum sodium value, very elevated serum osmolarity, renal failure, hypovolaemia, etc), my hypertonic agent of choice is:

Answer Choices	Responses
Mannitol	19.44% 7
Hypertonic saline	63.89% 23
Does not matter	16.67% 6
TOTAL	36

39. See Figure 27. Please choose amongst the following options for a severe TBI patient with elevated ICP upon monitor insertion for which treatment is felt indicated. Ancillary brain monitoring (e.g. PbtO₂, jugular venous saturation, etc.) is not available. In this instance, moderate hyperventilation (e.g. 30-35 mm Hg/4.0-4.6 kPa) should be:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	8.11% 3
Second level treatment	45.95% 17
Third level treatment (treatment of last resort)	27.03% 10
None of the above	18.92% 7
TOTAL	37

40. A severe TBI patient has elevated ICP upon monitor insertion for which pentobarbital ("barb coma") is felt indicated. In this instance, high-dose propofol ("propofol coma") is a reasonable alternative to high-dose pentobarbital ("barb coma"):

Answer Choices	Responses
Agree	64.86% 24
Disagree	35.14% 13
TOTAL	37

41. A severe TBI patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, external CSF drainage should be:

Answer Choices	Responses
A first-level treatment - basic response to ICP elevation	63.89% 23
An intermediate (second-level) treatment	30.56% 11
A treatment of last resort (third-level) treatment	2.78% 1
Not used	2.78% 1
TOTAL	36

42. A severe TBI patient has elevated ICP upon monitor insertion for which external CSF drainage is felt indicated. In most circumstances, the external CSF drainage should be managed as:

Answer Choices	Responses
Intermittent drainage (open to drainage only when a set threshold is exceeded)	61.11% 22
Continuous drainage (closed only intermittently for ICP measurement)	38.89% 14
TOTAL	36

43. There are specific instances in the clinical management of severe TBI patients where I favor intermittent drainage and others when I favor continuous drainage:

Answer Choices	Responses
Agree	48.65% 18
Disagree	51.35% 19
TOTAL	37

44. See Figure 28. Given the result from the previous survey, please choose amongst the following options for a severe TBI patient with elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, raising CPP above 60 mm Hg to lower ICP via intact pressure autoregulation should be:

Answer Choices	Responses
First level treatment (basic response to ICP elevation)	35.14% 13
An intermediate (second level) treatment	59.46% 22
A treatment of last resort (third-level) treatment	2.70% 1
Not used	2.70% 1
TOTAL	37

45. See Figure 29. A severe TBI patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, the initial default minimal CPP target should be (and may, of course, be modified subsequently based on further information).

Answer Choices	Responses
50 mm Hg	0.00% 0
60 mm Hg	94.59% 35
70 mm Hg	5.41% 2
Other, please specify in Comment box	0.00% 0
TOTAL	37

46. In a severe TBI patient with a stable CT without compressed cisterns and with reactive pupils who never has elevated ICP, when would you remove the ICP monitor in general?

Answer Choices	Responses
24 hours	22.86% 8
48 hours	28.57% 10
72 hours	31.43% 11
>72 hours	17.14% 6
TOTAL	35

47. In a severe TBI patient with a stable CT without compressed cisterns and with reactive pupils who never has elevated ICP, whose stable exam during a sedation holiday is GCSm 6, when would you remove the ICP monitor in general?

Answer ChoicesResponses	
24 hours	58.33% 21
48 hours	22.22% 8
72 hours	8.33% 3
>72 hours	11.11% 4
TOTAL	36

48. In a severe TBI patient with a stable CT without compressed cisterns and with reactive pupils who never has elevated ICP, whose stable exam during a sedation holiday was GCSm 4 or 5, when would you remove the ICP monitor in general?

Answer ChoicesResponses	
24 hours	22.22% 8
48 hours	33.33% 12
72 hours	16.67% 6
>72 hours	27.78% 10
TOTAL	36

49. In a severe TBI patient with a stable CT without compressed cisterns and with reactive pupils who never has elevated ICP, whose stable exam during a sedation holiday was GCSm 1-3, when would you remove the ICP monitor in general?

Answer ChoicesResponses	
24 hours	16.67% 6
48 hours	19.44% 7
72 hours	19.44% 7
>72 hours	44.44% 16
TOTAL	36

Answer ChoicesResponses

50. In a severe TBI patient with a stable CT without compressed cisterns and with reactive pupils who never has elevated ICP, who is post-op for a subdural haematoma, when would you remove the ICP monitor in general?

Answer Choices	Responses
24 hours	16.67% 6
48 hours	25.00% 9
72 hours	41.67% 15
>72 hours	16.67% 6
TOTAL	36

51. In a severe TBI patient with a stable CT without compressed cisterns who never has elevated ICP but who had stable anisocoria or bilateral pupillary dilation from admission, when would you remove the ICP monitor in general?

Answer Choices	Responses
24 hours	8.57% 3
48 hours	31.43% 11
72 hours	17.14% 6
>72 hours	42.86% 15
TOTAL	35

52. In a severe TBI patient with a stable CT, with reactive pupils, who never has elevated ICP but who had stable compressed cisterns from admission, when would you remove the ICP monitor in general?

Answer Choices	Responses
24 hours	11.11% 4
48 hours	22.22% 8
72 hours	27.78% 10
>72 hours	38.89% 14
TOTAL	36

Answer Choices Responses

Survey 3:

1. Insertion of a central line is close to achieving consensus at the level of Tier 0 (upon entry to the ICU) in any patient with a TBI severe enough to warrant ICP monitoring (50% as standard of care, 28% as recommended, for 78% as combined into a recommendation on the last vote). We believe that 80% consensus may be achieved if we seek consensus for the more conservative designation of it being recommended. Please re-vote with consideration of changing your vote to achieve consensus if you think it would be reasonable to do so. In patients with a TBI severe enough to warrant ICP monitor placement, insertion of a central line upon admission to the ICU (Tier Zero - irrespective of ICP values) is:

Answer Choices	Responses
Recommended [78% on last vote]	85.71% 30
Optional [22% on last vote]	14.29% 5
TOTAL	35

2. The use of arterial line monitoring of blood pressure achieved consensus as a Tier 0 intervention for severe TBI care (83%). We are close to arterial line blood pressure monitoring being designated as a standard of care for severe TBI patients with a TBI severe enough to warrant ICP monitor placement upon admission to the ICU (Tier Zero - irrespective of ICP values). Please re-vote with consideration of changing your vote if you think it would be reasonable to do so. Arterial line blood pressure monitoring for severe TBI patients is:

Answer Choices	Responses
A Standard of Care as a Zero Level treatment (basic to sTBI care in ICU) --[72% for on last vote]	94.29% 33
NOT a Standard of Care as a Zero Level Treatment (basic to TBI care) [28% for on last vote]	5.71% 2
TOTAL	35

3. In case arterial line blood pressure measurement does not achieve consensus as a standard of care on this vote we wish to pursue consensus on the more conservative designation of it being at least recommended. With this in mind please vote on whether arterial line blood pressure monitoring, as a Tier Zero level intervention for severe TBI patients is:

Answer Choices	Responses
Recommended	97.14% 34
Optional	2.86% 1
TOTAL	35

4. The use of end-tidal CO2 monitoring achieved consensus as a Tier 0 intervention (upon entry to the ICU) in any patient with a TBI severe enough to warrant ICP monitoring. End-tidal CO2 monitoring was close to being recommended as a standard of care (67[PH1] %). Please re-vote with consideration of changing your vote if you think it would be reasonable to do so. End-tidal monitoring for severe TBI patients as a zero level intervention (Basic to Severe TBI Care) is:

Answer Choices	Responses
A Standard of Care as a Zero Level treatment (basic to TBI care) [67% for on last vote]	80.00% 28
NOT a Standard of Care as a Zero Level treatment (basic to TBI care) [33% for on last vote]	20.00% 7
TOTAL	35

5. In case end-tidal CO2 measurement does not achieve consensus as a standard of care as a tier zero intervention on this vote, we wish to pursue consensus on the more conservative designation of it being at least recommended. With this in mind please vote on whether end-tidal CO2 measurement, as a zero level intervention for severe TBI patients is:

Answer Choices	Responses
Recommended [92% in a composite of last vote]	97.14% 34
Optional [8% in a composite of last vote]	2.86% 1
TOTAL	35

6. Temperature management to prevent fever is close to achieving consensus as a Tier 0 intervention. 74% of respondents considered temperature control to be Tier Zero (basic to admission of a monitored TBI patient into ICU) and another 20% considered it to be Tier 1 (Use in patient with established intracranial hypertension). Please re-vote with consideration of changing your vote to achieve consensus if you think it would be reasonable to do so. As such: NEW- In patients with a TBI severe enough to warrant ICP monitor placement, temperature management to prevent fever upon admission to the ICU (Tier Zero - irrespective of ICP values) is:

Answer Choices	Responses
A Tier Zero Intervention (Basic to ICU Care of Severe TBI) [74% on last vote]	80.00% 28
A Tier One Intervention (An early intervention in those with ICP Elevation) [20% on last vote]	20.00% 7
TOTAL	35

7. The role of hyperventilation in patients whose only monitored brain parameter is ICP (e.g. no PbtO₂ or SjVO₂), remains very controversial. 61% percent felt that driving the PaCO₂ below normal should only be used to treat a neurological emergency, while 39% felt it also had a use in treating intracranial hypertension. We will try to address it in another fashion.

	Yes	No	Total
Acute hyperventilation has a role in the treatment of an acute neurological emergency suspicious for, or definitely related to, intracranial hypertension (i.e. acute herniation events)	97.14% 34	2.86% 1	35
Hyperventilation has a role in the ongoing management of post-traumatic ICP elevation in addition to its role as a temporizing therapy (i.e. it should be included in one of the treatment tiers)	47.06% 16	52.94% 18	34

8. In our last survey 50% of respondents felt that for patients with a TBI severe enough to warrant ICP monitor placement, maintaining PaCO₂ at low end of normal (35-38 mm Hg/4.6-5.0 kPa) was a Tier Zero intervention (irrespective of ICP values) while 33.3% felt it was a tier 1 intervention to be initiated early after treatment of ICP elevation. We believe that we can achieve consensus for placing this intervention into Tier One as a more conservative approach. With this in mind do you support maintaining PaCO₂ at low end of normal (35-38 mm Hg/4.6-5.0 kPa) as a Tier One intervention for intracranial pressure elevation when ancillary brain monitoring is not available?

Answer Choices	Responses
Yes	80.00% 28
No	20.00% 7
TOTAL	35

9. In a previous survey 55% of respondents indicated that in patients with a severe TBI and WITHOUT ancillary brain monitoring (e.g. PbtO₂, jugular venous saturation, etc.) moderate hyperventilation (e.g. 30-35 mm Hg/4.0-4.6 kPa) is a Tier Two therapy. 29% voted for it as a Tier Three therapy in this context. We believe that we can achieve consensus for placing this intervention into Tier Three as a more conservative approach. With this in mind, do you support moderate hyperventilation (e.g. 30-35 mm Hg/4.0-4.6 kPa) in the absence of ancillary monitoring as a Tier Three intervention?

Answer Choices	Responses
Yes	65.71% 23
No	34.29% 12

Answer Choices Responses

TOTAL 35

10. Though hyperosmolar therapy is a mainstay of severe TBI care, it has not yet achieved 80% consensus for any query and it has not yet been assigned to any tier of therapy. 78% of respondents indicated that hyperosmolar therapy should be considered a First Tier treatment for ICP elevation while 22% felt it should be Second Tier. We believe we can achieve consensus on hyperosmolar therapy being a First Tier intervention. Please re-vote with consideration of changing your vote to achieve consensus if you think it would be reasonable to do so: A patient has an episode of elevated ICP for which treatment is felt indicated. In this instance, bolus treatment with a hypertonic solution (either mannitol OR saline) in response to ICP elevation should be:

Answer Choices	Responses
A First Tier intervention [78% on last vote]	91.43% 32
A Second Tier intervention [22% on last vote]	8.57% 3
TOTAL	35

11. A majority of voters were not in favor of scheduled bolus dosing of mannitol (73% against) or hypertonic saline (61% against). With this in mind we believe that we can achieve 80% consensus that neither hyperosmolar agent should be administered by automatic, scheduled infusion (ie. Every 4-6h). Please select one of the following:

Answer Choices	Responses
Scheduled infusion of hyperosmolar therapy (every 4-6h) SHOULD NOT be used.	88.57% 31
Scheduled infusion of hyperosmolar therapy (every 4-6h) should be assigned to a tier in the algorithm.	11.43% 4
TOTAL	35

12. A majority of voters were not in favor of continuous infusion of mannitol (88% against, consensus achieved) or hypertonic saline (57% against). With this in mind we might be able to achieve 80% consensus that hypertonic saline should not be administered by continuous infusion to treat ICP elevation. This vote has no bearing on the use of hypertonic saline infusions to treat hyponatremia. With this in mind:

Answer Choices	Responses
I believe that the administration of hypertonic saline by continuous administration has a role in the treatment of intracranial pressure elevation following severe TBI.	34.29% 12
I believe that the administration of hypertonic saline by continuous administration should not be used in the treatment of intracranial pressure elevation following severe TBI.	65.71% 23
TOTAL	35

13. There have been very mixed opinions on how different hyperosmolar therapy formulations should be used following severe TBI. One approach to building consensus would be to simplify how hyperosmolar therapy is described in the algorithm. With this in mind:

Answer Choices	Responses
I believe that the algorithm should simply refer to hyperosmolar therapy and allow for practitioners to use their own judgement with respect to agent and dose.	80.00% 28
I believe that we can and should achieve consensus on assigning different hyperosmolar agents or dosing strategies to different treatment tiers.	20.00% 7
TOTAL	35

14. No aspect of therapeutic hypothermia has been assigned to a tier as yet. The majority of respondents felt that mild hypothermia (e.g. 35-36.0°C) belonged in the Second Tier (56%). We would therefore like to attempt to achieve consensus for a place in the Second Tier. If this consensus cannot be achieved we believe it is likely to achieve consensus as a more conservative Third Tier therapy, prompting our questions below:

	Yes	No	Total
For a severe TBI patient with elevated ICP for which treatment is felt indicated, mild hypothermia (e.g. 35-36.0°C) should be a Second Tier treatment [56% for]:	31.43% 11	68.57% 24	35
If consensus for mild hypothermia (e.g. 35-36.0°C) as a second tier therapy is not achieved, I support it as a Third Tier treatment:	82.35% 28	17.65% 6	34

15. Consensus was not achieved with respect to the use of moderate hypothermia (<35°C) to treat severe TBI. We suspect that this may relate to the interpretation of the Eurotherm study (attached). We anticipate that some have concluded that Eurotherm should be interpreted as evidence that moderate hypothermia should not be used for severe TBI and that others have concluded that hypothermia should not be used as a tier 2 therapy for severe TBI. Please consider this paper and the breadth of the literature as you select your answer to the following: For a severe TBI patient with elevated ICP for which treatment is felt indicated I believe that moderate hypothermia (<35°C):

Answer Choices	Responses
Has a role in the treatment of severe TBI and should be assigned a tier in the algorithm	68.57% 24
Should never be used in the management of severe TBI	31.43% 11
TOTAL	35

16. We believe we can achieve consensus on increasing the analgesia dose to lower ICP being a First Tier intervention. Please re-vote with consideration of changing your vote to achieve consensus if you think it would be reasonable to do so. For a severe TBI patient with elevated ICP for which treatment is felt indicated, increasing the analgesia dose to lower ICP should be a:

Answer Choices	Responses
First Tier treatment (basic response to ICP elevation) [68% for in previous vote]	94.12% 32
Second Tier treatment [18% for in previous vote]	5.88% 2
TOTAL	34

17. We believe we can achieve consensus on increasing the sedation dose to lower ICP being a Tier 1 intervention. Please re-vote with consideration of changing your vote to achieve consensus if you think it would be reasonable to do so. For a severe TBI patient with elevated ICP for which treatment is felt indicated, increasing the sedation dose to lower ICP should be a:

Answer Choices	Responses
First Tier treatment (basic response to ICP elevation) [76% for in previous vote]	94.29% 33
Second Tier treatment [24% for in previous vote]	5.71% 2
TOTAL	35

18. The vote on neuromuscular blockade was very split, with 58% supporting Second Tier and 33% supporting Third Tier. We will attempt to achieve consensus for a Second Tier assignment, and for a more conservative Third Tier assignment should that be unsuccessful. We are therefore asking the question: For a severe TBI patient with elevated ICP for which treatment is felt indicated, do you support assigning neuromuscular blockade to lower ICP (given that a trial dose lowers ICP) be a Second Tier therapy?

Answer Choices	Responses
Yes	57.14% 20
No	42.86% 15
TOTAL	35

19. If neuromuscular blockade does not achieve 80% consensus as a Second Tier therapy for ICP elevation, do you support it as a Third Tier therapy?

Answer Choices	Responses
Yes	90.63% 29
No	9.38% 3
TOTAL	32

20. 72% did not feel that lumbar CSF drainage should be recommended. We are re-asking this question in the hopes of gaining consensus. For a severe TBI patient with elevated ICP for which treatment is felt indicated, lumbar CSF drainage (in the presence of a working EVD) to lower ICP should be a:

Answer Choices	Responses
Third Tier therapy	14.29% 5
Not recommended	85.71% 30
TOTAL	35

21. 79% did not feel that furosemide should be recommended. We will attempt to achieve consensus that furosemide should not be used to treat ICP elevation. With this in mind please answer the following question, and consider changing your answer to achieve consensus if you feel this is acceptable: For a severe TBI patient with elevated ICP for which treatment is felt indicated, furosemide to lower ICP is:

Answer Choices	Responses
Third Tier therapy	14.71% 5
Not recommended	85.29% 29
TOTAL	34

22. In the last survey 65% of respondents felt that 35°C was the temperature below which warming should be initiated. With this in mind please answer the following question, and consider changing your answer to achieve consensus if you feel this is acceptable: For a severe TBI patient coming in from the field in a hypothermic state, in the absence of intracranial hypertension to what target temperature should the patient be warmed?

Answer Choices	Responses
34°C [previously 18%]	0.00% 0
35°C [previously 65%]	70.59% 24
36°C	29.41% 10
TOTAL	34

23. In the last survey 74% of respondents felt that 7g/dL should be used as the transfusion threshold in severe TBI patients without evidence of cerebral ischemia or ischemia of other organs. With this in mind please consider changing your answer to achieve consensus if you feel this is acceptable:

Answer Choices	Responses
Use the threshold of 7 g/dl	82.86% 29
Use a higher threshold	17.14% 6
TOTAL	35

24. In a previous survey 71% of respondents indicated that they felt high-dose propofol ("propofol coma") could be listed as an alternative to high-dose pentobarbital) in Tier Three. With this in mind please respond and consider changing your answer to achieve consensus if you feel this is acceptable:

Answer Choices	Responses
Yes [71% for in previous survey]	77.14% 27
No [29% for in previous survey]	22.86% 8
TOTAL	35

25. CSF drainage is close to achieving consensus as a first tier therapy (67% on last survey). Please consider changing your vote to achieve consensus if this is acceptable to you for the following question: A patient has elevated ICP upon monitor insertion for which treatment is felt indicated. In this instance, placement of an EVD to facilitate CSF drainage (if an intraparenchymal monitor was used initially) should be:

Answer Choices	Responses
First Tier treatment [67% previously voted for CSF drainage as first tier]	80.00% 28
Second Tier treatment [27% previously voted for CSF drainage as second tier]	20.00% 7
TOTAL	35

26. The vote on recommending continuous drainage versus intermittent drainage (short period of drainage with the EVD otherwise closed) was indecisive (39% versus 61% respectively). Fifty three percent stated that there were not specific conditions that dictated a particular method. In light of these votes, should we attempt to resolve this vote or state that we leave it entirely to the treating physician?

Answer Choices	Responses
Iterate the voting to try to resolve a position on this.	42.86% 15
State that we leave it entirely to the treating physician.	57.14% 20
TOTAL	35

27. In the previous survey 58% of respondents indicated that augmenting blood pressure to lower ICP through intact pressure autoregulation is a tier 2 therapy. 36% felt this was a tier one therapy. With this in mind we believe we can achieve consensus that this is a more conservative tier two intervention. Therefore please answer the following question, and consider changing your answer to achieve consensus if you feel this is acceptable: In the absence of ancillary brain monitoring (only an ICP monitor in place), when a patient has elevated ICP for which treatment is felt indicated, should hypervolaemia and pressors be used to raise the CPP above 60 mm Hg if a trial demonstrates efficacy (suggesting intact pressure autoregulation):

Answer Choices	Responses
Yes, as a Second Tier treatment.	88.57% 31
No.	11.43% 4
TOTAL	35

Survey 4:

1. Should we strive toward a three tier system?

Answer Choices	Responses
Yes	87.50% 35
No	12.50% 5
TOTAL	40

2. If we decide to go toward a three tier system, is it reasonable to mimic BOOST3 and place mild hypothermia (35-37°C) into Tier Two?

Answer Choices	Responses
Yes	50.00% 20
No	50.00% 20
TOTAL	40

3. With respect to the use of hypertonic saline as osmotherapy for severe TBI, some practitioners use the same sodium and osmolality thresholds as for mannitol. Others use a higher limit for sodium and osmolality (most commonly 160 mEq/L and 360 mOsm/L). What is your opinion?

Answer Choices	Responses
Use same routine for hypertonic saline as for mannitol (Na 155 mEq/L and 320 mOsm/L)	67.50% 27
Use different thresholds	32.50% 13
TOTAL	40

4. We achieved consensus that hyperventilation should not be performed to pCO₂ levels below 30mmHg without ancillary monitoring (such as brain oxygen monitoring). In our last survey 65% of respondents supported hyperventilation to pCO₂ values between 30-35 mmHg as a tier 3 intervention. With this in mind would you support hyperventilation to pCO₂ values <35 mmHg when ancillary monitoring (ie. brain oxygen monitoring) is in place to provide reassurance with respect to safety?

Answer Choices	Responses
I support hyperventilation to pCO ₂ values < 35 mmHg when ancillary monitoring is in place as an intermediate tier 2 therapy	47.37% 18
I support hyperventilation to pCO ₂ values < 35 mmHg when ancillary monitoring is in place as a tier 3 therapy of last resort	36.84% 14
I do not believe that hyperventilation to pCO ₂ values < 35 mmHg should be performed even when ancillary monitoring is in place	15.79% 6
TOTAL	38

5. If you were to select a single additional means of monitoring in a severe TBI patient already undergoing ICP monitoring which would you choose?

Answer Choices	Responses
Intraparenchymal oxygen monitor	83.78% 31
Jugulovenous oxygen monitoring	5.41% 2
Intraparenchymal blood flow monitoring	2.70% 1
Intraparenchymal EEG monitoring	2.70% 1
Doppler ultrasonography	5.41% 2
Near Infrared Spectroscopy	0.00% 0
TOTAL	37

Answer Choices**Responses**

6. In survey #1, the favored timing and frequency of a “sedation holiday” to facilitate a neurological examination was once a shift, every day from the first post-injury day (52%). The second most favored frequency was once a day, every day beginning 48 hours post-injury (19%). With this in mind, please re-vote on what you believe to be the ideal timing and frequency for “sedation holidays” (withholding sedation to allow a neurological examination) in stable severe TBI patients.

Answer Choices	Responses
Once a shift, every day from the first post-injury day	45.95% 17
Once a day, every day from the first post-injury day	24.32% 9
Once a day, every day, starting at 48 hours post-injury	29.73% 11
TOTAL	37

7. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 26% of respondents indicated that performing a sedation holiday within 24h of injury was relatively contraindicated and 17% felt that it was absolutely contraindicated. With this in mind, please vote as to how timing within 24h of injury influences your decision to perform a sedation holiday:

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	35.00% 14
It is an absolute contraindication to performing a sedation holiday	7.50% 3
It does not influence my decision to perform a sedation holiday	32.50% 13
Responses Comment	25.00% 10
TOTAL	40

8. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 24% of respondents indicated that performing a sedation holiday within 48h of injury was relatively contraindicated and 14% felt that it was absolutely contraindicated. With this in mind, please vote as to how timing within 48h of injury influences your decision to perform a sedation holiday:

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	36.84% 14
It is an absolute contraindication to performing a sedation holiday	5.26% 2
It is NOT a contraindication to the performance of a sedation holiday	57.89% 22

Answer Choices	Responses
TOTAL	38

9. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 61% of respondents indicated that a worsening neurological examination is a relative contraindication to performing a sedation holiday and 50% felt that it was an absolute contraindication. With this in mind, please vote as to how a worsening neurological exam influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	43.59% 17
It is an absolute contraindication to performing a sedation holiday	33.33% 13
It is NOT a contraindication to the performance of a sedation holiday	23.08% 9
TOTAL	39

10. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 34% of respondents indicated that an abnormal pupillary examination, unchanged from admission is a relative contraindication to performing a sedation holiday and 8% felt that it was an absolute contraindication. With this in mind, please vote as to how an abnormal pupillary examination, unchanged from admission influences your decision to perform a sedation holiday:

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	34.21% 13
It is an absolute contraindication to performing a sedation holiday	5.26% 2
It is NOT a contraindication to the performance of a sedation holiday	60.53% 23
TOTAL	38

11. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 55% of respondents indicated that new onset of an abnormal pupillary exam is a relative contraindication to performing a sedation holiday and 50% felt that it was an absolute contraindication. With this in mind, please vote as to how new onset of an abnormal pupillary exam influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	33.33% 13
It is an absolute contraindication to performing a sedation holiday	38.46% 15
It is NOT a contraindication to the performance of a sedation holiday	28.21% 11

Answer Choices	Responses
TOTAL	39

12. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 74% of respondents indicated that ongoing elevation of ICP is a relative contraindication to performing a sedation holiday and 67% felt that it was an absolute contraindication. With this in mind, please vote as to how ongoing elevation of ICP influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	48.72% 19
It is an absolute contraindication to performing a sedation holiday	48.72% 19
It is NOT a contraindication to the performance of a sedation holiday	2.56% 1
TOTAL	39

13. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 18% of respondents indicated that a GCS motor score of 1-3 is a relative contraindication to performing a sedation holiday and 11% felt that it was an absolute contraindication. With this in mind, please vote as to how a GCS motor score of 1-3 influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	21.05% 8
It is an absolute contraindication to performing a sedation holiday	5.26% 2
It is NOT a contraindication to the performance of a sedation holiday	73.68% 28
TOTAL	38

14. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 5% of respondents indicated that a GCS motor score of 4 is a relative contraindication to performing a sedation holiday and 3% felt that it was an absolute contraindication. With this in mind, please vote as to how a GCS motor score of 4 influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	13.16% 5
It is an absolute contraindication to performing a sedation holiday	2.63% 1
It is NOT a contraindication to the performance of a sedation holiday	84.21% 32
TOTAL	38

15. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 29% of respondents indicated that a stable repeat CT with compressed cisterns (Marshall DI III) is a relative contraindication to performing a sedation holiday and 14% felt that it was an absolute contraindication. With this in mind, please vote as to how a stable repeat CT with compressed cisterns (Marshall DI III) influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	39.47% 15
It is an absolute contraindication to performing a sedation holiday	5.26% 2
It is NOT a contraindication to the performance of a sedation holiday	55.26% 21
TOTAL	38

16. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 8% of respondents indicated that a stable repeat CT with midline shift < 5mm is a relative contraindication to performing a sedation holiday and 3% felt that it was an absolute contraindication. With this in mind, please vote as to how a stable repeat CT with midline shift <5mm influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	18.42% 7
It is an absolute contraindication to performing a sedation holiday	2.63% 1
It is NOT a contraindication to the performance of a sedation holiday	78.95% 30
TOTAL	38

17. With respect to potential contraindications to the performance of sedation holidays, in Survey #1 34% of respondents 7. contraindication to performing a sedation holiday and 31% felt that it was an absolute contraindication. With this in mind, please vote as to how a stable repeat CT with midline shift > or = 5mm (Marshall DI IV or with a mass lesion) influences your decision to perform a sedation holiday.

Answer Choices	Responses
It is a relative contraindication to performing a sedation holiday	50.00% 19
It is an absolute contraindication to performing a sedation holiday	10.53% 4
It is NOT a contraindication to the performance of a sedation holiday	39.47% 15

Answer Choices	Responses
TOTAL	38

18. Do you feel that our algorithm for the management of severe TBI should specifically address the management of brain hypoxia (as determined by objective measurement)?

Answer Choices	Responses
Yes, it should.	82.50% 33
No, it should not.	17.50% 7
TOTAL	40

19. Do you feel that our algorithm for the management of severe TBI should specifically address the management of traumatic subarachnoid hemorrhage?

Answer Choices	Responses
Yes, it should.	58.97% 23
No, it should not.	41.03% 16
TOTAL	39

20. Do you feel that our algorithm for the management of severe TBI should specifically address the management of patients who ARE or ARE NOT autoregulating?

Answer Choices	Responses
Yes, it should.	77.50% 31
No, it should not.	22.50% 9
TOTAL	40

21. Do you feel that our algorithm for the management of severe TBI should specifically address the management of coagulopathy?

Answer Choices	Responses
Yes, it should.	75.00% 30
No, it should not.	25.00% 10
TOTAL	40

Answer Choices	Responses
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Survey 6:

1. No specific therapy required.

Answer Choices	Responses
Acceptable as is	89.47% 34
Acceptable, but not at this tier	2.63% 1
Not acceptable	7.89% 3
TOTAL	38

2. Adjust head of the bed to lower ICP

Answer Choices	Responses
Acceptable as is	88.57% 31
Acceptable, but not at this tier	2.86% 1
Not acceptable	8.57% 3
TOTAL	35

3. Ensure Temperature < 38 ° C

Answer Choices	Responses
Acceptable as is	91.67% 33
Acceptable, but not at this tier	0.00% 0
Not acceptable	8.33% 3
TOTAL	36

4. Adjust pharmacological analgesia and sedation

Answer Choices	Responses
Acceptable as is	91.43% 32
Acceptable, but not at this tier	2.86% 1
Not acceptable	5.71% 2
TOTAL	35

5. CSF drainage (if EVD available)

Answer Choices	Responses
Acceptable as is	91.43% 32
Acceptable, but not at this tier	8.57% 3
Not acceptable	0.00% 0
TOTAL	35

6. Standard dose Mannitol (0.25 – 1.0 g/kg)

Answer Choices	Responses
Acceptable as is	66.67% 22
Acceptable, but not at this tier	18.18% 6
Not acceptable	15.15% 5
TOTAL	33

7. Hypertonic saline

Answer Choices	Responses
Acceptable as is	74.29% 26
Acceptable, but not at this tier	14.29% 5
Not acceptable	11.43% 4
TOTAL	35

8. Consider anti-seizure medications for 1 week only.

Answer Choices	Responses
Acceptable as is	83.33% 30
Acceptable, but not at this tier	5.56% 2
Not acceptable	11.11% 4
TOTAL	36

9. Lower PaCO₂ to 32 – 35 mm Hg

Answer Choices	Responses
Acceptable as is	82.86% 29
Acceptable, but not at this time	5.71% 2
Not acceptable	11.43% 4
TOTAL	35

10. High dose Mannitol >1 g/kg, or higher frequency of standard dose mannitol

Answer Choices	Responses
Acceptable as is	62.86% 22
Acceptable, but not at this time	14.29% 5
Not acceptable	22.86% 8
TOTAL	35

11. Repeat CT to determine if increased size of intracranial mass lesions

Answer Choices	Responses
Acceptable as is	86.11% 31
Acceptable, but not at this time	13.89% 5
Not acceptable	0.00% 0
TOTAL	36

12. Treat surgically remediable lesions with craniotomy according to guidelines

Answer Choices	Responses
Acceptable as is	80.56% 29
Acceptable, but not at this time	19.44% 7
Not acceptable	0.00% 0
TOTAL	36

13. Adjust temperature to 35 - 37° C using active cooling measures.

Answer Choices	Responses
Acceptable as is	60.00% 21
Acceptable, but not at this time	25.71% 9
Not acceptable	14.29% 5
TOTAL	35

14. Pentobarbital coma, according to local protocol

Answer Choices	Responses
Acceptable as is	77.14% 27
Acceptable, but not at this tier	14.29% 5
Not acceptable	8.57% 3
TOTAL	35

15. Decompressive craniectomy

Answer Choices	Responses
Acceptable as is	83.33% 30
Acceptable, but not at this tier	13.89% 5
Not acceptable	2.78% 1
TOTAL	36

16. Adjust temperature to 32 – 34.5 oC, using active cooling measures

Answer Choices	Responses
Acceptable as is	41.67% 15
Acceptable, but not at this tier	5.56% 2
Not acceptable	52.78% 19
TOTAL	36

17. Neuromuscular paralysis

Answer Choices	Responses
Acceptable as is	52.78% 19
Acceptable, but not at this tier	38.89% 14
Not acceptable	8.33% 3
TOTAL	36

18. Adjust head of the bed to improve brain oxygen level

Answer Choices	Responses
Acceptable as is	77.78% 28
Acceptable, but not at this tier	0.00% 0
Not acceptable	22.22% 8
TOTAL	36

19. Ensure Temperature < 38° C.

Answer Choices	Responses
Acceptable as is	88.89% 32
Acceptable, but not at this tier	2.78% 1
Not acceptable	8.33% 3
TOTAL	36

20. Increase CPP to max = 70 mm Hg with fluid

Answer Choices	Responses
Acceptable as is	71.43% 25
Acceptable, but not at this tier	2.86% 1
Not acceptable	25.71% 9
TOTAL	35

21. If PaO2 is already in desired range, increase PaO2 by increasing FiO2 to 60%.

Answer Choices	Responses
Acceptable as is	80.00% 28
Acceptable, but not at this tier	8.57% 3
Not acceptable	11.43% 4
TOTAL	35

22. Increase PaO2 by adjusting positive end expiratory pressure (PEEP)

Answer Choices	Responses
Acceptable as is	54.29% 19
Acceptable, but not at this tier	28.57% 10
Not acceptable	17.14% 6
TOTAL	35

23. Consider EEG monitoring

Answer Choices	Responses
Acceptable as is	88.89% 32
Acceptable, but not at this tier	5.56% 2
Not acceptable	5.56% 2
TOTAL	36

24. Consider anti-seizure medications (AEDs)

Answer Choices	Responses
Acceptable as is	77.78% 28
Acceptable, but not at this tier	8.33% 3
Not acceptable	13.89% 5
TOTAL	36

25. Increase PaO2 by increasing FiO2 to 100%

Answer Choices	Responses
Acceptable as is	47.22% 17
Acceptable, but not at this tier	22.22% 8
Not acceptable	30.56% 11
TOTAL	36

26. Increase PaO2 by adjusting PEEP

Answer Choices	Responses
Acceptable as is	65.71% 23
Acceptable, but not at this tier	14.29% 5
Not acceptable	20.00% 7
TOTAL	35

27. Increase CPP above 70 mm Hg with fluid boluses or vasopressors

Answer Choices	Responses
Acceptable as is	83.33% 30
Acceptable, but not at this tier	5.56% 2
Not acceptable	11.11% 4
TOTAL	36

28. Adjust ventilatory rate to increase PaCO₂ to 45 – 50 mm Hg

Answer Choices	Responses
Acceptable as is	40.00% 14
Acceptable, but not at this tier	8.57% 3
Not acceptable	51.43% 18
TOTAL	35

29. Transfuse pRBCs to Hgb > 10 g/dL

Answer Choices	Responses
Acceptable as is	58.33% 21
Acceptable, but not at this tier	16.67% 6
Not acceptable	25.00% 9
TOTAL	36

30. Decrease ICP to < 10 mm Hg

Answer Choices	Responses
Acceptable as is	44.12% 15
Acceptable, but not at this tier	2.94% 1
Not acceptable	52.94% 18
TOTAL	34

31. CSF drainage

Answer Choices	Responses
Acceptable as is	91.43% 32
Acceptable, but not at this tier	5.71% 2
Not acceptable	2.86% 1
TOTAL	35

32. Increased sedation

Answer Choices	Responses
Acceptable as is	88.89% 32
Acceptable, but not at this tier	5.56% 2
Not acceptable	5.56% 2
TOTAL	36

33. Adjust head of the bed to lower ICP

Answer Choices	Responses
Acceptable as is	91.67% 33
Acceptable but not at this tier	2.78% 1
Not acceptable	5.56% 2
TOTAL	36

34. Ensure Temperature < 38° C.

Answer Choices	Responses
Acceptable as is	91.43% 32
Acceptable but not at this tier	0.00% 0
Not acceptable	8.57% 3
TOTAL	35

35. Adjust pharmacological analgesia and sedation

Answer Choices	Responses
Acceptable as is	97.14% 34
Acceptable but not at this tier	0.00% 0
Not acceptable	2.86% 1
TOTAL	35

36. CSF drainage (if EVD available)

Answer Choices	Responses
Acceptable as is	97.22% 35
Acceptable but not at this tier	2.78% 1
Not acceptable	0.00% 0
TOTAL	36

37. Increase CPP to max = 70 mm Hg with fluid

Answer Choices	Responses
Acceptable as is	70.59% 24
Acceptable but not at this tier	11.76% 4
Not acceptable	17.65% 6
TOTAL	34

38. Standard dose Mannitol (0.25 – 1.0 mg/kg)

Answer Choices	Responses
Acceptable as is	82.86% 29
Acceptable but not at this tier	5.71% 2
Not acceptable	11.43% 4
TOTAL	35

39. Hypertonic saline

Answer Choices	Responses
Acceptable as is	91.18% 31
Acceptable but not at this tier	5.88% 2
Not acceptable	2.94% 1
TOTAL	34

40. If PaO2 is already in desired range, increase PaO2 by increasing FiO2 to 60%

Answer Choices	Responses
Acceptable as is	82.35% 28
Acceptable but not at this tier	8.82% 3
Not acceptable	8.82% 3
TOTAL	34

41. Increase PaO2 by adjusting positive end expiratory pressure (PEEP)

Answer Choices	Responses
Acceptable as is	55.88% 19
Acceptable but not at this tier	26.47% 9
Not acceptable	17.65% 6
TOTAL	34

42. Maintain PaCO2 \geq 35 mm Hg

Answer Choices	Responses
Acceptable as is	88.89% 32
Acceptable but not at this tier	2.78% 1
Not acceptable	8.33% 3
TOTAL	36

43. Consider EEG monitoring

Answer Choices	Responses
Acceptable as is	94.44% 34
Acceptable but not at this tier	2.78% 1
Not acceptable	2.78% 1
TOTAL	36

44. Consider anti-seizure medications for 1 week only.

Answer Choices	Responses
Acceptable as is	86.11% 31
Acceptable but not at this tier	0.00% 0
Not acceptable	13.89% 5
TOTAL	36

45. High dose Mannitol >1 g/kg, or higher frequency of standard dose mannitol

Answer Choices	Responses
Acceptable as is	80.00% 28
Acceptable, but not at this tier	0.00% 0
Not acceptable	20.00% 7
TOTAL	35

46. Increase CPP above 70 mm Hg with fluid boluses or vasopressors

Answer Choices	Responses
Acceptable as is	77.14% 27
Acceptable, but not at this tier	5.71% 2
Not acceptable	17.14% 6
TOTAL	35

47. Increase PaO2 by increasing FiO2 to 100%

Answer Choices	Responses
Acceptable as is	55.88% 19
Acceptable, but not at this tier	14.71% 5
Not acceptable	29.41% 10
TOTAL	34

48. Increase PaO2 by increasing PEEP

Answer Choices	Responses
Acceptable as is	65.71% 23
Acceptable, but not at this tier	14.29% 5
Not acceptable	20.00% 7
TOTAL	35

49. Transfuse pRBCs to Hgb \geq 10 g/dL

Answer Choices	Responses
Acceptable as is	55.56% 20
Acceptable, but not at this tier	16.67% 6
Not acceptable	27.78% 10
TOTAL	36

50. Repeat CT to determine if increased size of intracranial mass lesions

Answer Choices	Responses
Acceptable as is	82.86% 29
Acceptable, but not at this tier	17.14% 6
Not acceptable	0.00% 0
TOTAL	35

51. Treat surgically remediable lesions with craniotomy according to guidelines

Answer Choices	Responses
Acceptable as is	83.33% 30
Acceptable, but not at this tier	16.67% 6
Not acceptable	0.00% 0
TOTAL	36

52. Induced hypothermia to 35 - 37 oC, using active cooling measures

Answer Choices	Responses
Acceptable as is	71.43% 25
Acceptable, but not at this tier	17.14% 6
Not acceptable	11.43% 4
TOTAL	35

53. Pentobarbital coma, according to local protocol

Answer Choices	Responses
Acceptable as is	83.33% 30
Acceptable, but not at this tier	8.33% 3
Not acceptable	8.33% 3
TOTAL	36

54. Decompressive craniectomy

Answer Choices	Responses
Acceptable as is	91.67% 33
Acceptable, but not at this tier	5.56% 2
Not acceptable	2.78% 1
TOTAL	36

55. Induced hypothermia to 32 – 34.5° C, using active cooling measures.

Answer Choices	Responses
Acceptable as is	51.43% 18
Acceptable, but not at this tier	2.86% 1
Not acceptable	45.71% 16
TOTAL	35

56. Neuromuscular paralysis.

Answer Choices	Responses
Acceptable as is	66.67% 24
Acceptable, but not at this tier	22.22% 8
Not acceptable	11.11% 4
TOTAL	36

Survey 7:

1. Rewording of "Standard dose Mannitol (0.25 – 1.0 g/kg)" to "Mannitol at routine dosing (generally 0.25 – 1.0 g/kg)"

Answer Choices	Responses
Agree with this modification	81.58% 31
No not agree with this modification	18.42% 7
TOTAL	38

2. Rewording of "Hypertonic saline" to "Hypertonic saline at routine dosing"

Answer Choices	Responses
Agree with this modification	73.68%

Answer Choices	Responses
	28
No not agree with this modification	26.32% 10
TOTAL	38

3. Rewording of “High dose Mannitol >1 g/kg, or higher frequency of standard dose mannitol” to “Trial of higher dose Mannitol (e.g. >1 g/kg)”

Answer Choices	Responses
Agree with this modification	68.42% 26
No not agree with this modification	31.58% 12
TOTAL	38

4. Rewording of “Treat surgically remediable lesions with craniotomy according to guidelines” to “Reconsider surgical options for potentially surgical lesions (e.g. contusions)”

Answer Choices	Responses
Agree with this modification	84.21% 32
No not agree with this modification	15.79% 6
TOTAL	38

5. Per your comments, this has now been moved to Tier 2 from Tier 3 – “Neuromuscular paralysis, if trial dose is effective”

Answer Choices	Responses
Agree with this modification	86.84% 33
No not agree with this modification	13.16% 5
TOTAL	38

6. Rewording of “Pentobarbital coma, according to local protocol” to “Pentobarbital, Thiopentone, or Propofol coma, according to local protocol, if trial dose is effective”

Answer Choices	Responses
Agree with this modification	86.84% 33
No not agree with this modification	13.16% 5
TOTAL	38

7. Per your comments, this has now been moved to Tier 3 – “Adjust temperature to 35 – 37o C, using active cooling measures”

Answer Choices	Responses
Agree with this modification	84.21% 32
No not agree with this modification	15.79% 6
TOTAL	38

8. Per your comments, this has now been reworded from “Increase CPP to max = 70 mm Hg with fluid” to “Increase CPP to max = 70 mm Hg with fluid or pressors “

Answer Choices	Responses
Agree with this modification	97.30% 36
No not agree with this modification	2.70% 1
TOTAL	37

9. Rewording of “Adjust head of the bed to improve brain oxygen level” to “Trial of lowering head of the bed to improve brain oxygen level”

Answer Choices	Responses
Agree with this modification	75.68% 28
No not agree with this modification	24.32% 9
TOTAL	37

10. There was some controversy over the treatment “If PaO2 is already in desired range, increase PaO2 by increasing FiO2 to 60%”. Most of this addressed if it should be Tier 1 or Tier 2. We will try to settle this here.

Answer Choices	Responses
Acceptable as is at Tier 1	31.58% 12
Acceptable as is at Tier 2	52.63% 20
Not acceptable	15.79% 6
TOTAL	38

11. Rewording of “Consider anti-seizure medications (AEDs)” to “Reconsider anti-seizure medications (AEDs) if not being used”

Answer Choices	Responses
Agree with this modification	78.95%

Answer Choices	Responses
	30
No not agree with this modification	21.05% 8
TOTAL	38

12. Per your comments, this has now been moved to Tier 2 and reworded from “Increase PaO2 by adjusting positive end expiratory pressure (PEEP)” to “Increase PaO2 by adjusting positive end expiratory pressure (PEEP) if a trial is effective. Upper limit = 10 cm H2O”

Answer Choices	Responses
Agree with this modification	76.32% 29
No not agree with this modification	23.68% 9
TOTAL	38

13. This passed at the prior vote at Tier 2 but rewording was requested. This option has been reworded from “Increase CPP above 70 mm Hg with fluid boluses” to “Increase CPP above 70 mm Hg with fluid boluses or vasopressors”

Answer Choices	Responses
Agree with this modification	94.74% 36
No not agree with this modification	5.26% 2
TOTAL	38

14. Per your comments, this has now been reworded from “Transfuse pRBCs to Hgb > 10 g/dL” to Transfuse 1 unit pRBCs to improve PbtO2”

Answer Choices	Responses
Agree with this modification	67.57% 25
No not agree with this modification	32.43% 12
TOTAL	37

15. Per your comments, this has now been reworded from “Decrease ICP to < 10 mm Hg” to “Decrease ICP to < 22 mm Hg (using Type D ICP interventions)”

Answer Choices	Responses
Agree with this modification	81.08% 30

Answer Choices	Responses
No not agree with this modification	18.92% 7
TOTAL	37

16. Per your comments, this has now been moved to Tier 3 – “Increase PaO2 by increasing FiO2 to 100%.”

Answer Choices	Responses
Agree with this modification	72.97% 27
No not agree with this modification	27.03% 10
TOTAL	37

17. Per your comments, a higher PEEP trial has been suggested for Tier 3 - “Increase PaO2 by adjusting positive end expiratory pressure (PEEP) to > 10 cm H2O if a trial is effective”

Answer Choices	Responses
Agree with this modification	65.79% 25
No not agree with this modification	34.21% 13
TOTAL	38

18. Per your comments, this has now been moved to Tier 3 and reworded from “Adjust ventilatory rate to increase PaCO2 to 45 – 50 mm Hg” to “Adjust ventilatory rate to increase PaCO2 to 45 - 50 mm Hg (Avoid intracranial hypertension)”

Answer Choices	Responses
Agree with this modification	80.56% 29
No not agree with this modification	19.44% 7
TOTAL	36

19. Per your comments, a second transfusion option has been worded for Tier 3 “Transfuse pRBCs to Hgb > 10 g/dL

Answer Choices	Responses
Agree with this modification	73.68%

Answer Choices	Responses
	28
No not agree with this modification	26.32% 10
TOTAL	38

20. Rewording of “Standard dose Mannitol (0.25 – 1.0 g/kg)” to “Mannitol at routine dosing (generally 0.25 – 1.0 g/kg)”

Answer Choices	Responses
Agree with this modification	76.32% 29
No not agree with this modification	23.68% 9
TOTAL	38

21. Rewording of “Hypertonic saline” to “Hypertonic saline at routine dosing”

Answer Choices	Responses
Agree with this modification	76.32% 29
No not agree with this modification	23.68% 9
TOTAL	38

22. Per your comments, this has now been reworded from “Increase CPP to max = 70 mm Hg with fluid” to “Increase CPP to max = 70 mm Hg with fluid or pressors “

Answer Choices	Responses
Agree with this modification	97.37% 37
No not agree with this modification	2.63% 1
TOTAL	38

23. There was some controversy over the treatment “If PaO2 is already in desired range, increase PaO2 by increasing FiO2 to 60%”. Most addressed -- should it be Tier 1 or Tier 2? We will try to settle this here.

Answer Choices	Responses
Acceptable as is at Tier 1	29.73%

Answer Choices	Responses
	11
Acceptable as is at Tier 2	51.35% 19
Not acceptable	18.92% 7
TOTAL	37

24. Rewording of “High dose Mannitol >1 g/kg, or higher frequency of standard dose mannitol” to “Trial of higher dose Mannitol (e.g. >1 g/kg)”

Answer Choices	Responses
Agree with this modification	68.42% 26
No not agree with this modification	31.58% 12
TOTAL	38

25. Per your comments, this has now been moved to Tier 2 from Tier 3 – “Neuromuscular paralysis, if trial dose is effective”

Answer Choices	Responses
Agree with this modification	89.47% 34
No not agree with this modification	10.53% 4
TOTAL	38

26. Per your comments, this has now been moved to Tier 2 and reworded from “Increase PaO₂ by adjusting positive end expiratory pressure (PEEP)” to “Increase PaO₂ by adjusting positive end expiratory pressure (PEEP) if a trial is effective. Upper limit = 10 cm H₂O”

Answer Choices	Responses
Agree with this modification	73.68% 28
No not agree with this modification	26.32% 10
TOTAL	38

27. Per your comments, this has now been reworded from “Increase CPP to max = 70 mm Hg with fluid” to “Increase CPP to max = 70 mm Hg with fluid or pressors “

Answer Choices	Responses
Agree with this modification	94.74% 36
No not agree with this modification	5.26% 2
TOTAL	38

28. Per your comments, this has now been rewored from “Transfuse pRBCs to Hgb > 10 g/dL” to Transfuse 1 unit pRBCs to improve PbtO2”

Answer Choices	Responses
Agree with this modification	71.05% 27
No not agree with this modification	28.95% 11
TOTAL	38

29. Per your comments, this has now been rewored from “Increase CPP above 70 mm Hg with fluid boluses” to “Increase CPP above 70 mm Hg with fluid boluses or vasopressors”

Answer Choices	Responses
Agree with this modification	94.44% 34
No not agree with this modification	5.56% 2
TOTAL	36

30. Rewording of “Treat surgically remediable lesions with craniotomy according to guidelines” to “Reconsider surgical options for potentially surgical lesions (e.g. contusions)”

Answer Choices	Responses
Agree with this modification	84.21% 32
No not agree with this modification	15.79% 6
TOTAL	38

31. Rewording of “Pentobarbital coma, according to local protocol” to “Pentobarbital, Thiopentone, or Propofol coma, according to local protocol, if trial dose is effective”

Answer Choices	Responses
Agree with this modification	86.84%

Answer Choices	Responses
	33
No not agree with this modification	13.16% 5
TOTAL	38

32. Induced hypothermia to 32 – 34.5 oC, using active cooling measures

Answer Choices	Responses
Agree with this modification	51.35% 19
No not agree with this modification	48.65% 18
TOTAL	37

33. Per your comments, this has now been moved to Tier 3 – “Increase PaO2 by increasing FiO2 to 100%.”

Answer Choices	Responses
Agree with this modification	67.57% 25
No not agree with this modification	32.43% 12
TOTAL	37

34. Per your comments, a higher PEEP trial has been suggested for Tier 3 - “Increase PaO2 by adjusting positive end expiratory pressure (PEEP) to > 10 cm H2O if a trial is effective”

Answer Choices	Responses
Agree with this modification	67.57% 25
No not agree with this modification	32.43% 12
TOTAL	37

35. Per your comments, this has now been moved to Tier 3 – “Adjust temperature to 35 – 37 oC, using active cooling measures”

Answer Choices	Responses
Agree with this modification	78.95% 30
No not agree with this modification	21.05% 8
TOTAL	38

36. Per your comments, a second transfusion option has been worded for Tier 3 "Transfuse pRBCs to Hgb > 10 g/dL"

Answer Choices	Responses
Agree with this modification	68.42% 26
No not agree with this modification	31.58% 12
TOTAL	38

37. Before performing a surgical procedure (intracranial device placement or open neurosurgery) on a severe TBI patient what is the minimum platelet count you would require?

Answer Choices	Responses
100,000	43.24% 16
75,000	32.43% 12
50,000	21.62% 8
20,000	2.70% 1
TOTAL	37

38. Before performing a surgical procedure (intracranial device placement or open neurosurgery) on a severe TBI patient what is the INR (International Normalized Ratios) you would require?

Answer Choices	Responses
2.0	2.86% 1
1.8	2.86% 1

Answer Choices	Responses
1.6	22.86% 8
1.5	57.14% 20
1.0	14.29% 5
TOTAL	35

39. In a patient who requires an emergent procedure such as an external ventricular drain or open neurosurgery to alleviate immediately life-threatening intracranial pressure elevation, would you perform the procedure prior to full correction of coagulopathy when this cannot be immediately achieved?

Answer Choices	Responses
Yes	76.32% 29
No	23.68% 9
TOTAL	38

40. How often should an ICP or advanced neuromonitor be checked for a valid response to physiological manipulations (ie. putting pressure on the abdomen to verify an increase in ICP values)? Assume that the intervention would only be performed if judged to be safe.

Answer Choices	Responses
Once per day	45.95% 17
Once per shift	40.54% 15
Don't check it -- just assume it is working properly	13.51% 5
TOTAL	37

41. In a prior survey, 67.5% of respondents indicated that they use the same hypertonic saline threshold for hypertonic saline as for mannitol (Na 155 mEq/L and 320 mOsm/L) while 32.5% stated they would use a higher limit for hypertonic saline. We wish to re-vote to see if we can achieve consensus on this topic:

Answer Choices	Responses
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Answer Choices	Responses
I recommend using the same sodium and osmolality thresholds for limiting hypertonic saline infusion as for mannitol	67.57% 25
I recommend using distinct thresholds for the two hyperosmolar agents (advise in comments section)	32.43% 12
TOTAL	37