

**District Health Board  
Neurosurgeon, Dr B**

**A Report by the  
Health and Disability Commissioner**

**(Case 16HDC01498)**



## **Contents**

Executive summary .....	1
Complaint and investigation .....	2
Information gathered during investigation .....	2
Opinion: Dr B — breach.....	8
Opinion: the DHB — other comment.....	12
Recommendations.....	15
Follow-up actions .....	15
Appendix A: Independent advice to the Commissioner .....	17



## Executive summary

1. In 2015, Mr A underwent neurosurgery at a public hospital for the removal of a metastatic carcinoma.
2. Dr B determined the positioning of the surgery using a stereotactic guidance machine (stereotaxy), and he and registrar Dr C marked on Mr A's skin where the incision would be. Once the initial incision was made, however, it became apparent that the stereotaxy was inaccurate. Dr B extended the bone opening into what he thought was the correct area. However, it became apparent that the opening had been made in the wrong place of Mr A's skull. The operation was then discontinued.
3. Further attempts to remove the tumour were considered to be too risky.

## Findings

4. In the Commissioner's view, once Dr B realised that the craniotomy was in the wrong location, he should have undertaken further checks prior to deciding to proceed. The Commissioner therefore considered that Dr B did not provide services to Mr A with reasonable care and skill and, accordingly, that Dr B breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code).<sup>1</sup>
5. The Commissioner was also critical that Dr B did not arrange for a follow-up consultation with Mr A after the surgery.
6. The Commissioner considered that the district health board (DHB) did not breach the Code.

## Recommendations

7. It was recommended that the DHB shared services group use this report as part of a case study to educate the neurosurgery community on the risk of incorrect craniotomy placement, and to assess further ways to prevent such an event occurring again.
8. It was also recommended that Dr B provide a written apology to Mr A's family.

---

<sup>1</sup> Right 4(1) states: "Every consumer has the right to have services provided with reasonable care and skill."

## Complaint and investigation

9. The Health and Disability Commissioner (HDC) received a complaint from Mrs A about the services provided to her late husband, Mr A, by Dr B and the DHB. The following issues were identified for investigation:
- *Whether the DHB provided Mr A with an appropriate standard of care in 2015.*
  - *Whether Dr B provided Mr A with an appropriate standard of care in 2015.*
10. The parties directly involved in the investigation were:
- |       |                       |
|-------|-----------------------|
| Mrs A | Complainant           |
| Dr B  | Provider/neurosurgeon |
| DHB   | Provider              |
11. Information was also obtained from Dr C (a registrar during the time of these events).
12. Independent expert advice was obtained from a neurosurgeon, Dr Agadha Wickremesekera, and is included as Appendix A.
- 

## Information gathered during investigation

### Background

13. Mr A underwent neurosurgery (a craniotomy) for the removal of a metastatic carcinoma (which had spread from a colorectal cancer). During the surgery, the incorrect part of the skull was cut into. Following the surgery, Mr A made a reasonable recovery. However, in response to the provisional opinion, Mrs A noted that following this event they were unable to travel to overseas for family events.
14. The DHB told HDC that in the context of Mr A's tumour, both surgical removal and radiotherapy were appropriate treatment options. However, because of the error, further attempts to remove the tumour via surgery were considered to be too risky. Mr A received radiotherapy following the surgery, but sadly he died some time later as a result of the cancer.

### *Use of a registrar in Mr A's surgery*

15. Mr A's wife told HDC she had been under the impression that the neurosurgery consultant, Dr B,<sup>2</sup> would be performing the craniotomy, but she learnt that his registrar, Dr C, "at least initiated the surgery".

---

<sup>2</sup> A Fellow of the Royal Australasian College of Surgeons and a Member of the Neurosurgical Society of Australasia.

16. At the time, Dr C was a trainee on placement at the public hospital as part of his Royal Australasian College of Surgeons (RACS) training programme. Dr C was an accredited neurosurgical trainee in the neurosurgery trainee programme and, at the time of Mr A's surgery, Dr C was an advanced trainee in neurosurgery. Dr B told HDC that Dr C already had several years of experience in neurosurgery, and at the time of Mr A's surgery had completed many unsupervised craniotomies on behalf of Dr B. The Neurosurgery Society of Australasia had signed off Dr C as being competent to perform cranial procedures independently. Dr B told HDC that accordingly Dr C was considered competent to perform the craniotomy on his own.
17. Dr C met with Mr and Mrs A on the day before the surgery. Dr C said that he introduced himself as a member of the neurosurgical team assisting Dr B. It is documented that Dr C discussed the indication for, and risks of, the procedure. Dr C sought Mr A's formal written consent for the procedure on the day of the surgery. The DHB told HDC that Mr A was made aware that Dr C would be involved with his operation, and that the procedure would be performed under the supervision of, and mainly by, Dr B.
18. The DHB told HDC that although Mr A was under the care of Dr B, who assumed clinical responsibility for him, "[d]uring his time at [the DHB], and as is usual practice throughout all New Zealand DHBs, [Dr B] was assisted in caring for [Mr A] by multiple neurosurgical registrars".
19. The exact role of each surgeon in the procedure was not specified in the notes or discussed with Mr A. The DHB told HDC that this is not usually done, as neurosurgery registrars are involved in all neurosurgical procedures at the DHB. The DHB also told HDC:
- "The exact contribution of the registrar to the operation depends on the experience of the registrar and on the decision of the Consultant surgeon at the time. All procedures are performed with the knowledge of a Consultant Neurosurgeon who is available for the duration of the procedure."
20. The DHB said that the above practice "is standard practice throughout hospitals in New Zealand". Dr C's involvement in the various stages of the surgery is outlined in more detail below.

*Positioning of Mr A in preparation for surgery*

21. The DHB told HDC that the "positioning" of the craniotomy<sup>3</sup> was a decision made by Dr B. Dr B told HDC that he was present for the "positioning" and registration of Mr A with the stereotactic guidance machine (stereotaxy), and that he and Dr C had marked on the skin where the incision would be (in what they thought was the area where the tumour was — the transverse sinus).

---

<sup>3</sup> A craniotomy is an incision in a patient's scalp and opening of an area in the skull, which then allows the surgeon access to the intracranial space. In this situation, the tumor resection was guided by computer-aided stereotactic techniques.

22. Although the scalp markings were made with indelible markers, the DHB told HDC that the markings can become difficult to see after sterile preparation of the surgical field (with alcoholic skin preparation).
23. Dr B and Dr C positioned Mr A into the prone position (face down) and felt confident that they had ensured accurate registration to the stereotaxy.
24. The stereotaxy system involves the use of computers and imaging based on diagnostic tests such as MRI and CT scans to aid in reaching the precise location within the brain that is to be treated. The technique requires the use of a frame placed onto the skull using superficially placed markers or landmarks on the scalp.
25. To “register” a patient, a probe traces around the surface of the scalp and the computer then matches this to the scalp on an MRI scan.
26. The MRI scans of the brain, in conjunction with these computers and localising frames, provide a three-dimensional image of the tumour within the brain. It is useful in making the distinction between tumour tissue and healthy tissue, and in reaching the precise location of the abnormal tissue.
27. The DHB told HDC that the precision of the system depends on the patient’s surface anatomy, and can be verified by checking specific anatomical points on a patient before starting the procedure. The DHB further told HDC that with a patient in the prone position, it can be difficult to get a very accurate registration, and especially if the patient has a short or thick neck, as was the case with Mr A.
28. Dr B explained that with patients in the prone position, an issue with the guidance system is that the MRI scans are taken with the patient lying on the back of his or her head, which can distort the anatomy of the scalp and affect the registration. Secondly, as the back of the head is relatively featureless, it is harder for the computer to accurately map the tracking to the patient’s scan, as registration is more accurate if there are sharp alterations in the contour that is being traced out (as with faces). Additionally, the area of concern is covered by muscle underlying the scalp, and therefore it is also more difficult to register accurately to an MRI scan, as the area is mobile.
29. Dr B told HDC that once the patient is registered to the stereotaxy system, the accuracy of its navigation is checked by looking at predetermined landmarks to see if they correlate with the findings on the system. He said that they then run the tracer over the scalp in all directions to see that it is following the scalp on the scan. He told HDC: “While I do not recall the specifics of this case, I am confident that we would have been satisfied with the accuracy of the registration prior to proceeding.”

*Absence of consultant from theatre*

30. Following the registration, Dr B left the theatre “while [Dr C] prepped and draped [Mr A] and commenced the initial approach”. The DHB and Dr B told HDC that Dr C had been assessed as competent to carry out the “approach” for Mr A’s procedure in preparation for



the craniotomy. Dr B told HDC: "I do not believe ... my being present for the actual preparation and draping would have made a significant difference to the outcome."

31. Dr B estimates that he was away from the room for 15–20 minutes. He said that this would be very standard practice within the department, and that it was not during the "critical" component of the surgery. However, he further stated: "An adequately trained and credentialed Registrar is capable of performing certain aspects of surgery without increasing the risks of an adverse outcome." Furthermore, Dr B told HDC that Dr C was in fact qualified and capable of carrying out the process on his own.

#### *Opening of the skull*

32. Dr C told HDC that the team made sure that Mr A was correctly positioned a further time prior to any scalp incision being made.
33. Dr B said that he re-joined the operation at the point when the skull opening was to be performed, and he was present and supervising at the time the actual craniotomy occurred. Dr C stated that the rest of the operation proceeded under Dr B's direction.
34. The DHB told HDC that Dr B made the incision (based on Mr A's anatomical landmarks as well as the navigational guidance system). In contrast, Dr C told HDC that he performed the skin incision and exposed the suboccipital bone (under the supervision and guidance of Dr B). It is agreed by all, however, that it was Dr B himself who performed the extension of the bone opening (set out below), and performed all "critical aspects of care".
35. Once the skull had been opened, the transverse sinus was not visualised.
36. Dr B told HDC that the stereotaxy stated that they were in the appropriate position, but it became apparent that this was inaccurate. He said: "[T]he exact cause of this is uncertain to me although there may have been a small movement in the articulated arm."
37. The DHB told HDC that the location being "out" could happen "if the original registration was not perfect, or if the frame had moved after registration". The DHB stated:

"A small movement of the registration frame may occur without it being obvious to the surgical team, resulting in the navigation being less accurate. This is why skin markings that are visible during the operation are used to verify the navigation. If the skin marking is off because of difficult anatomy, the opening of the skull may be in a suboptimal place and not where it was planned to be."

38. In Mr A's case, the skin markings that had been placed based on anatomic landmarks preoperatively had washed off with the preparation for surgery, and therefore could not be used for cross-reference.
39. Dr B told HDC: "We elected to proceed however based on anatomical landmarks." He said: "My previous experience had been that if the sinus can not be seen, then the craniotomy is usually too low. We extended it up further" and an opening was made at "what was thought to be a large sub-occipital sinus".

40. However, the sagittal sinus was inadvertently divided, and it became apparent that the opening had been made in the wrong place. It was considered that the only option was to close the site and discontinue the operation.
41. Dr B told HDC:
- “The key error in this case was my failure to challenge this assumption and consider that the craniotomy needed to be extended downwards and this occurred wholly within the time frame in which I was operating.”
42. Dr B has acknowledged to HDC that Mr A’s surgery was “inaccurately performed”, and that he takes responsibility for this. He believes that the contributing factors included:
1. Excessive reliance on stereotactic guidance, which proved to be inaccurate. He said that particularly in the prone position, it can be hard to get accurate registration.
  2. Failure to challenge assumptions based on previous experience: “My previous experience had been that if the sinus can not be seen, then the craniotomy is usually too low. We extended it up further” and an opening was made at “what was thought to be a large sub-occipital sinus”. He said that he now ensures that he can feel the base of the skull to gain full orientation if the initial craniotomy does not demonstrate where the transverse sinus is.
  3. Loss of skin markings with prepping — he now uses staples so that the marks cannot be lost. He noted, however, that “surgical findings intra-operatively once bone is taken off are of greater importance than markings on the scalp”. He said that this is because the landmarks used are not always present and do not always correlate directly with the location of the sinus.
43. The DHB acknowledged that there was “a ‘significant error’ in the placement of the craniotomy”. However, it said that the correct processes were followed. The DHB told HDC that what occurred was an unforeseen complication that was contributed to by a difficult anatomy, which was compounded by an intraoperative surgical error. The DHB stated that on reviewing Mr A’s MRI that was used for navigation, “it is obvious that [Mr A] had difficult anatomy”. It further said:
- “It is sometimes extremely difficult to find the external occipital protuberance, which is one of the scalp markers used to decide clinically where the transverse sinus is situated. This was in part one of the possible reasons for the incorrect bone flap placement.”
44. Dr B told HDC:
- “I believe the error in this operation occurred after the initial craniotomy had been performed, which I was present [in theatre] for. The error comprised not realising that the sinus was in fact beneath rather than above the initial craniotomy and that the craniotomy needed to be extended down rather than up.”

### Post events

45. Mrs A complained that following this event Dr B stopped all contact with the family, causing further stress for them.
46. Mr A was seen daily by the neurosurgical registrars until his discharge.
47. There are three documented instances in the notes following surgery where Dr B communicated with Mr A. It is documented that after the surgery Dr B also spoke to Mrs A in person, and explained the events. It is further noted that Dr B spoke to her again recommending to her and Mr A a second opinion from another consultant regarding treatment options, and arranged for a review by a radiation oncologist.
48. Mr A's discharge summary stated, "[Dr B] will organise f/u in private," and advised Mr A to liaise with Dr B regarding this. However, the follow-up was not arranged, and Dr B said that this was an omission.
49. The DHB told HDC that all neurosurgical complications are presented annually at a National Audit Meeting, and Mr A's case was presented anonymously at such a meeting.
50. The DHB told HDC that it did not make any changes following this incident. It said:

"The incorrect craniotomy placement was caused by difficult anatomy and possibly movement of the Stereotactic Guidance Frame after registration. These are known potential problems that usually do not lead to serious consequences. In [Mr A's] case the craniotomy was placed too high, and the saggital sinus was inadvertently divided. The sinus must have been small as it was not recognized as the sinus, and the patient came to no harm from the division."

### Responses to provisional opinion

51. The parties were all given the opportunity to respond to the relevant sections of my provisional opinion.
52. The DHB and Dr B responded, and their responses have been incorporated where relevant. Mrs A was provided with a copy of the "information gathered" part of the provisional opinion. She noted that Dr B had already performed two prior surgeries on her husband, and "was well acquainted with [Mr A's] anatomy". She further noted that due to the previous surgeries, "there would also be tell-tale scarring".
53. Mrs A said that if it was a known common problem to get an accurate registration when a patient is in the prone position or has an unusual anatomy, "[W]hat did they do about checking it?" She also stated that following her husband's surgery, she was told by Dr B that due to the injury, Mr A would not be expected to survive the next 24–26 hours. Therefore, she queried the DHB's response that "the patient came to no harm from the division".

## **Opinion: Dr B — breach**

### **Use and supervision of registrar — no breach**

54. After Mr A had been registered to the stereotaxy, Dr B exited the theatre for about 15–20 minutes, and left his registrar, Dr C, to finish preparing Mr A for surgery and to begin the initial approach with the neuronavigation system.
55. Dr C was an accredited neurosurgical trainee in the neurosurgery trainee programme, and at the time of Mr A's surgery Dr C was an advanced trainee in neurosurgery. Dr B told HDC that Dr C already had several years of experience in neurosurgery, and that at the time of Mr A's surgery, had completed many unsupervised craniotomies on behalf of Dr B. The Neurosurgery Society of Australasia had signed off Dr C as being competent to perform cranial procedures independently.
56. Dr B told HDC: "I do not believe ... my being present for the actual preparation and draping would have made a significant difference to the outcome." Furthermore, Dr B is sure that they would not have proceeded until they were certain that the navigation system had been checked, and Dr C stated that all had been checked prior to commencing.
57. Dr B and the DHB have stated that any error that occurred was carried out while Dr B was in the theatre.
58. My independent expert advisor, neurosurgeon Dr Agadha Wickremesekera, advised that "more intensive supervision of the registrar during the marking, preparation of the scalp, draping, and remarking of the patient's scalp may be useful recommendations for improvement to prevent a similar occurrence in the future", but also advised that Dr B's supervision of the registrar was adequate and satisfactory.
59. Dr Wickremesekera stated: "[T]his fact of not being in theatre for a short period of time with a senior registrar cannot be regarded as negligence, as this practice occurs frequently in ... practice."
60. I accept this advice. Although learnings can be taken from this case, I am satisfied that it was appropriate for Dr C to be involved in the surgery, and that the level of supervision that Dr B provided was adequate. There is also no evidence on the information presented to me that any error was due to Dr C acting alone in the theatre at any time.

### **Surgery — breach**

61. Dr B told HDC that he was present for the "positioning" and registration of Mr A with the stereotaxy, and that he and Dr C had marked on the skin where the incision would be (in what they thought was the area where the tumour was situated — the transverse sinus). Dr B and Dr C placed Mr A into the prone position, and felt confident that they had ensured accurate registration to the stereotaxy.
62. After then leaving the theatre for 15–20 minutes, as discussed above, Dr B re-joined the operation at the point when the skull opening was to be performed, and said that he was

present and supervising at the time the actual craniotomy (opening of the skull) occurred. Dr C stated that the team made sure that Mr A was correctly positioned a further time prior to any scalp incision being made. However, once the skull had been opened, the transverse sinus was not visualised.

63. The stereotaxy system stated that they were in the appropriate position, but it became apparent to Dr B that this was inaccurate. He said: “[T]he exact cause of this is uncertain to me although there may have been a small movement in the articulated arm.”
64. I note that the DHB explained that a small movement of the registration frame may occur without it being obvious to the surgical team, resulting in the navigation being less accurate.
65. It cannot now be identified why the guidance was tracking inaccurately. Dr Wickremesekera advised that the neuronavigation can sometimes move, hence the registration will be in error.
66. Because the system can be “out”, the DHB said that skin markings can be used to verify the navigation. If the skin marking is off because of difficult anatomy, the opening of the skull may not be in the correct place. In this case, the skin markings that had been placed based on the anatomical landmarks preoperatively had washed off with the preparation for surgery, and therefore this could not be used for cross-reference. The DHB also stated that Mr A had “difficult anatomy”, and said:
- “It is sometimes extremely difficult to find the external occipital protuberance, which is one of the scalp markers used to decide clinically where the transverse sinus is situated. This was in part one of the possible reasons for the incorrect bone flap placement.”
67. Dr B has stated that he now uses staples so that markings cannot be lost. However, I note his statement that “surgical findings intra-operatively once bone is taken off are of greater importance than markings on the scalp” because the landmarks are not always present and do not always correlate directly with the location of the sinus.
68. When it was realised that the stereotaxy system was inaccurate, Dr B said they elected to proceed based on anatomical landmarks. He stated: “My previous experience had been that if the sinus can not be seen, then the craniotomy is usually too low. We extended it up further” and an opening was made at “what was thought to be a large sub-occipital sinus”.
69. However, the sagittal sinus was inadvertently divided, and it became apparent that the opening had been made in the wrong place. I note that the DHB has stated that the correct processes were followed, and that what occurred was “an unforeseen complication which was contributed to by a difficult anatomy which was compounded by an intraoperative surgical error”.

70. Dr B told HDC: “The error comprised not realising that the sinus was in fact beneath rather than above the initial craniotomy and that the craniotomy needed to be extended down rather than up.” Further, he has expressed that “[t]he key error” was his failure to challenge his assumption that the craniotomy was too low based on previous experience where he had struggled to find the transverse sinus. He said that he now ensures that he can feel the base of the skull to gain full orientation if the initial craniotomy does not demonstrate the position of the transverse sinus.
71. Dr Wickremesekera advised that the process (before, during, and after the surgery) followed by Dr B does not deviate from what would be followed by most neurosurgeons. Dr Wickremesekera stated:
- “The overall neurosurgical care ... appears to be within the accepted standard of care. The surgery was prepared and planned appropriately. The post operative care was adequate.
- The standard of skill and care taken [during the operation] again also appears to be satisfactory.”
72. Despite the above, Dr Wickremesekera stated:
- “In this case for unknown reasons, despite the normal acceptable neurosurgical processes by both the neurosurgeon and the neurosurgical registrar, an error has occurred which is not within an acceptable standard of neurosurgical care.”
73. Dr Wickremesekera advised that the error of placing the craniotomy in the wrong place is a departure from the accepted standards of neurosurgical care. He further advised that “placing the craniotomy in the wrong place in this manner has to be regarded as a significant error”.
74. Dr Wickremesekera stated:
- “The craniotomy was expected to be below the transverse sinuses so that one would be looking at the cerebellum rather than the occipital lobes of the cerebrum with a view to making the approach towards the pineal gland above the cerebellum and under the transverse sinuses and tentorium heading deep into the pineal region.”
75. Dr Wickremesekera further stated that in hindsight:
- “During the opening of the dura one could in retrospect suggest that the surface anatomy of the occipital lobes should have been recognised as well as the sagittal sinus. This did not occur and in terms of the practical outcome there has been a departure of an accepted standard.”
76. Dr Wickremesekera noted that the complexity of this surgery is high, hence neurosurgeons are wary of the approach to the pineal region. He advised:

“I and my peers as well as the neurosurgeon involved would consider this error unacceptable but we would all admit that we could all make such an error ... This is a potential error that any neurosurgeon can make.”

77. However, Dr Wickremesekera also said: “Such an error can be made infrequently.”
78. Dr Wickremesekera advised that normal acceptable neurosurgical processes were followed during the procedure. While noting this, I am particularly guided by the following parts of his advice:
- “[D]espite the normal acceptable neurosurgical processes by both the neurosurgeon and the neurosurgical registrar, an error has occurred which is not within an acceptable standard of neurosurgical care.”
  - “During the opening of the dura one could in retrospect suggest that the surface anatomy of the occipital lobes should have been recognised as well as the sagittal sinus. Unfortunately this did not occur and in terms of the practical outcome there has been a departure of an accepted standard.”
  - “The complexity of this surgery is high. Hence neurosurgeons are wary of the approach to the pineal region. Having noted this the frequency of this type of error in performing the craniotomy and dividing the sagittal sinus would be rare. I and my peers as well as the neurosurgeon involved would consider this error unacceptable but we would all admit that we could all make such an error.”
  - “[T]he error of placing the craniotomy in the wrong place is a departure from the accepted standards of neurosurgical care. Placing the craniotomy in the wrong place in this manner has to be regarded as a significant error and one must acknowledge that the error has been made and accept the problems associated with it ...”
79. I concur with Dr Wickremesekera’s advice above. I also note that Dr B has himself stated that “[t]he key error” was his failure to challenge the assumption that when struggling to find the transverse sinus one is usually below it. I note that Dr B now ensures that he feels the base of the skull to gain full orientation if the initial craniotomy does not demonstrate the position of the transverse sinus. However, I am critical that during the time of these events, instead of re-checking Mr A’s positioning after realising that the navigation system was tracking incorrectly and that the scalp markings had washed off, he proceeded with extending the incision upwards without challenging his own assumption first.
80. Whether or not the consumer has difficult anatomy, it is my opinion that taking the time to undertake any checks available to ascertain that the surgeon is in the right place before proceeding with such surgery is paramount. In this case, I am also mindful of Dr Wickremesekera’s comment about the complexity of this particular surgery. I agree with Dr Wickremesekera’s advice that placing the craniotomy in the wrong place is a departure from the accepted standards of neurosurgical care. As stated by Dr Wickremesekera, this

error is “unacceptable”. In light of the above, I am critical that Dr B failed to perform the craniotomy correctly and, in particular, did not challenge his assumption that he should extend the opening upward rather than downward.

81. There were known risks with this complex surgery, including difficulties when the patient is placed in the prone position, and that the stereotaxy system can move. Once Dr B realised that the craniotomy was in the wrong location, I consider that as the scalp markings had washed off, removing one of the crucial checking tools, Dr B should have undertaken further checks such as feeling the base of the skull prior to deciding to proceed. He did not do this, and proceeded to extend the craniotomy in the wrong place. I consider that Dr B did not provide services to Mr A with reasonable care and skill. Accordingly, for all of the reasons above, I find that Dr B breached Right 4(1) of the Code.

#### **Follow-up — adverse comment**

82. Mrs A complained that following these events, Dr B stopped all contact with the family.
83. I note that there are several documented instances in the notes following surgery where Dr B communicated with Mr and Mrs A. It is also noted that he recommended that they seek a further opinion in relation to on-going treatment, and that this occurred.
84. However, Mr A’s discharge summary stated: “[Dr B] will organise f/u in private.” Mr A was advised to liaise with Dr B regarding this; however, the follow-up was not arranged. Dr B has said that this was an omission.
85. While Mr A was put forward for follow-up by other specialists, and this occurred, I note that the follow-up with Dr B did not go ahead, and I am critical of this.

---

#### **Opinion: the DHB — other comment**

86. As a healthcare provider, the DHB is responsible for providing services in accordance with the Code.

#### **Use of registrar**

87. Registrar Dr C met with Mr and Mrs A on the day before Mr A’s surgery. Dr C told HDC that he introduced himself as a member of the neurosurgical team that would be assisting the consultant, Dr B. The DHB said that Mr A was made aware that Dr C would be involved with the surgery, but that it would be performed under the supervision of, and mainly by, Dr B.
88. During the surgery, Dr B was away from the theatre for approximately 15–20 minutes. During this time, Dr C prepped and draped Mr A and commenced the initial “approach”. Dr B said that this would be very standard practice within the department, and that it was not during the “critical” component of the surgery.



89. Mr A's wife said that she had been under the impression that Dr B would be performing her husband's surgery, and was unhappy that Dr C was involved in the early stages of the surgery.
90. The DHB stated that it is usual for neurosurgery registrars to be involved in all neurosurgical procedures at the DHB. Both the DHB and Dr B told HDC that Dr C had been assessed as competent to carry out the "approach" for Mr A's procedure in preparation for the craniotomy.
91. Dr Wickremesekera advised that neurosurgeons operate with their neurosurgical registrars, and often will allow the neurosurgical registrar to perform various parts of the operation.
92. As it is accepted practice for registrars to be involved in this type of surgery, I am not critical of the use of Dr C in Mr A's surgery. However, while I am not able to make a finding about precisely what information was conveyed to Mr and Mrs A about Dr C's involvement in the surgery, given the differing accounts I have been given, it appears that the information could have been communicated more clearly. Information regarding who will be performing their surgery is information that reasonable consumers would expect to receive, and can be relevant to informed consent. I suggest that the DHB reflect on the way in which its staff communicates such information to consumers, with a view to avoiding any similar lack of clarity in the future.

## **Surgery**

### *Preparation for procedure*

93. The DHB told HDC that the positioning of the craniotomy was a decision made by Dr B. Dr B said that he was present for the "positioning" and registration of Mr A with the stereotactic guidance machine, and both he and Dr C marked on the skin with indelible marker where the incision should be.
94. The DHB told HDC that the precision of the stereotactic guidance system depends on the surface anatomy, and that when the patient is in the prone position it can be difficult to get a very accurate registration, especially if the patient has a short or thick neck, as was apparently the case with Mr A.
95. Dr B said that before starting a procedure, the accuracy of the navigation is verified by checking specific anatomical points to see if they correlate with the findings on the guidance system. He said that they then run the tracer over the scalp in all directions to see that it is following the scalp on the scan. I note that Dr B told HDC: "... I am confident that we would have been satisfied with the accuracy of the registration prior to proceeding." I further note that Dr C told HDC that the team made sure that Mr A was correctly positioned a further time prior to any scalp incision being made.

### *Opening of skull*

96. Dr B was present and supervising at the time the actual craniotomy (opening of the skull) occurred. I note that the DHB has told HDC that Dr B made the incision (based on Mr A's

anatomical landmarks and the navigational guidance system), while Dr C has said that he performed the skin incision and exposed the suboccipital bone. It is agreed by all, however, that it was Dr B himself who performed the extension of the bone opening and then performed all “critical aspects of care”.

#### *Craniotomy*

97. Once the skull had been cut into and the bone opening began, the transverse sinus could not be visualised.
98. Dr B stated that it became apparent that the stereotactic guidance was inaccurate. It cannot be identified why the guidance was tracking inaccurately.
99. Dr Wickremesekera advised that “[t]he neuronavigation can sometimes move hence the registration will be in error ...”. He also advised: “Robust checking of the neuronavigation ... may be [a] useful recommendation for improvement to prevent a similar occurrence in the future.” I note again that Dr C told HDC that the team made sure that Mr A was correctly positioned a further time prior to any scalp incision being made.
100. While I am not able to make a finding as to whether there was any movement of the neuronavigation system, I agree with Dr Wickremesekera’s view that robust checking is obviously important.
101. The skin markings (made with indelible markers) that had been placed based on the anatomic landmarks preoperatively had washed off with the preparation for surgery, and therefore could not be used as a cross-reference. I note that Dr B now uses staples during such surgery, although I further note that he told HDC that “surgical findings intra-operatively once bone is taken off are of greater importance than markings on the scalp” because the landmarks used are not always present and do not always correlate directly with the location of the sinus.
102. Dr B said that when they realised that the stereotaxy system was inaccurate, they elected to proceed based on anatomical landmarks. He stated: “My previous experience had been that if the sinus can not be seen, then the craniotomy is usually too low. We extended it up further” and an opening was made at “what was thought to be a large sub-occipital sinus”.
103. However, it became apparent that the surgical opening had been made in the wrong place.
104. The DHB told HDC that on reviewing Mr A’s MRI that was used for navigation (after these events), “it is obvious that [Mr A] had difficult anatomy”. The DHB further said:

“It is sometimes extremely difficult to find the external occipital protuberance, which is one of the scalp markers used to decide clinically where the transverse sinus is situated. This was in part one of the possible reasons for the incorrect bone flap placement.”
105. The DHB stated that while there was “a ‘significant error’ in the placement of the craniotomy”, the correct processes were followed.

- 
106. Dr Wickremesekera was of the same view. He noted that it appears from the facts of this case that using the anatomical landmarks as well as the neuronavigation system failed, and accordingly the position of the craniotomy was incorrect. He stated:
- “[D]espite the normal acceptable neurosurgical processes by both the neurosurgeon and the neurosurgical registrar, an error has occurred which is not within an acceptable standard of neurosurgical care.”
107. Dr Wickremesekera advised that the error of placing the craniotomy in the wrong place is a departure from the accepted standards of neurosurgical care, but that “[t]his is a potential error that any neurosurgeon can make”. He also advised: “The overall neurosurgical care ... appears to be within the accepted standard of care. The surgery was prepared and planned appropriately. The post operative care was adequate.”
108. Dr B has told HDC that in his view “[t]he key error” was his failure to challenge the assumption that when struggling to find the transverse sinus one is usually below it, and so he decided to extend the opening upward rather than downward. He has stated that this error occurred wholly within the time frame in which he was operating, and that he takes responsibility for the error.
109. Having considered all of the above, I consider that the placing of the craniotomy in the wrong place does not indicate broader systems or organisational issues at the DHB. Therefore, I consider that the DHB did not breach the Code directly.
- 

## Recommendations

110. I recommend that Dr B provide a written letter of apology to Mr A’s family for his failings as identified in this report. The apology is to be provided to HDC within three weeks of the date of this opinion, for forwarding to Mrs A.
111. I recommend that DHB shared services use this report as part of a case study in relation to educating the neurosurgical community on the possibility of placing a craniotomy incorrectly, to further assess ways to limit such a possibility occurring again.
- 

## Follow-up actions

112. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be sent to the Medical Council of New Zealand, and it will be advised of Dr B’s name.

113. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be sent to the Royal Australasian College of Surgeons, and it will be advised of Dr B's name.
114. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be sent to the Neurosurgical Society of Australasia and placed on the Health and Disability Commissioner website, [www.hdc.org.nz](http://www.hdc.org.nz), for educational purposes.

## Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from Dr Agadha Wickremesekera:

“Re: [Mr A], Ref: 16HDC01498

This man was admitted to [the public hospital] under the care of the Department of Neurosurgery [in] 2015. He had metastatic colon cancer with a lesion in the pineal region. After an initial endoscopic biopsy and third ventriculostomy, his hydrocephalus was treated with a right ventriculoperitoneal shunt [two days later] and he went on to have an attempted suboccipital craniotomy to debulk the pineal region metastasis. At the time of the operation craniotomy was performed at an incorrect site and unexpectedly the superior sagittal sinus above the torcular was ligated and divided. Post operatively the patient did not suffer a venous infarct which could have been catastrophic. He made a reasonable recovery thereafter. Further surgery was deemed prohibitively risky given the circumstances.

The overall neurosurgical care provided to [Mr A] appears to be within the accepted standard of care. The surgery was prepared and planned appropriately. The post operative care was adequate.

The standard of skill and care taken during the operation again also appears to be satisfactory. The surgical planning was performed by the neurosurgeon with the registrar. The surgical markings were performed by the neurosurgeon with the registrar. Whilst the draping and the scalp incision were performed the surgeon had stepped out. He returned to theatre during the time of the craniotomy where the error was made. The neurosurgeon comments that the surface marks were washed off during the preparation of the scalp. They used anatomical landmarks as well as the neuronavigation system. On both counts the position of the craniotomy was incorrect which then led to dividing the dura in the incorrect position which then further led to ligating and dividing the superior sagittal sinus above its junction with the transverse sinuses or torcula. The craniotomy was expected to be below the transverse sinuses so that one would be looking at the cerebellum rather than the occipital lobes of the cerebrum with a view to making the approach towards the pineal gland above the cerebellum and under the transverse sinuses and tentorium heading deep to the pineal region.

Reading the operative note the standard of care for this process was satisfactory however inadvertently the error was made hence there is a departure from the accepted standards of neurosurgical outcomes. Such an error can be made infrequently. As in this case all neurosurgeons use anatomical landmarks as well as the assistance of the neuronavigation.

During the opening of the dura one could in retrospect suggest that the surface anatomy of the occipital lobes should have been recognised as well as the sagittal sinus. Unfortunately this did not occur and in terms of the practical outcome there has been a departure of an accepted standard.

[Dr B's] supervision of the registrar was adequate and satisfactory. He was present for the planning and positioning of the patient and he returned prior to undertaking the craniotomy. Depending on the seniority of the registrar neurosurgeons often do this and sometimes would allow the senior registrars to undertake the craniotomy as well as the tumour debulking with the neurosurgeon available or at hand in theatre observing the case. In this case he was there during the craniotomy scrubbed and was undertaking the procedure with the registrar. The complexity of this surgery is high. Hence neurosurgeons are wary of the approach to the pineal region. Having noted this the frequency of this type of error in performing the craniotomy and dividing the sagittal sinus would be rare. I and my peers as well as the neurosurgeon involved would consider this error unacceptable but we would all admit that we could all make such an error. Fortunately a catastrophic outcome did not occur.

[Dr B] has responded in a very appropriate and compassionate manner. He has transparently discussed the problem with the patient as well as his wife. He has outlined exactly the nature of the error as well as the fortunate outcome and deemed further surgery prohibitively risky. The error in itself has not had an adverse effect to the patient in terms of causing a venous stroke. In terms of the metastatic tumour in the pineal region, surgery would have achieved debulking of the tumour which would then be followed by radiotherapy +/- chemotherapy. However in this case as the case could not proceed to surgical debulking there is a minimal adverse outcome to the patient's quality of life or survival, as one could assume that the response to adjuvant therapy may be less effective. Many neurosurgeons would not offer debulking surgery for a pineal region metastatic prostate carcinoma, as the risks are moderate and measured potential benefit.

Overall I believe that [Dr B] has acted in a very appropriate and responsible manner given the occurrence of an unlikely error in placing the craniotomy and dividing the superior sagittal sinus for a pineal region for an approach to the pineal region by supracerebellar infratentorial approach. The neuronavigation can sometimes move hence the registration will be in error and of course anatomical landmarks can be made in error as in this case. This is a potential error that any neurosurgeon can make. Robust checking of the neuronavigation as well as more intensive supervision of the registrar during the marking, preparation of the scalp, draping, and remarking of the patient's scalp may be useful recommendations for improvement to prevent a similar occurrence in the future.

Please do not hesitate to contact me for further clarification of my comments.

Kind regards

Yours sincerely

Agadha Wickremesekera MB ChB(Otago) MD FRACS  
**Neurosurgeon**

The following further comment was received from Dr Wickremesekera on 3 April 2017:

“Thank you for your letter dated 24 March 2017.

I appreciate your comments. I have also further reviewed [Mrs A’s] letter dated 25 November 2016.

The process followed by the neurosurgeon does not deviate from what would be followed by most neurosurgeons in the country. The process that I have discussed is the preoperative workup, preparation for surgery on the day, and how the surgery was undertaken. Neurosurgeons operate with their neurosurgical registrars and often will allow the neurosurgical registrar to perform various parts of the operation, all as part of the teaching process. This may be cutting the scalp, or setting up the navigation or any other part of the operation. In this case the neurosurgeon left the theatre for the 20 minutes or so, when the error was made and then further propagated after his return.

I agree there is a [contradiction] of terms of my conclusion but I am not about to change my view. If I may attempt to explain, as I have said before, the general overall neurosurgical care in terms of the process before, during and after the surgery was within an accepted standard of care, however the error of placing the craniotomy in the wrong place is a departure from the accepted standards of neurosurgical care. Placing the craniotomy in the wrong place in this manner has to be regarded as a significant error and one must acknowledge that the error has been made and accept the problems associated with it and move on. I believe that the neurosurgeon has done just that at the time. Later it appears that in the process of follow up there was a degree of disengagement by the neurosurgeon, which is a deviation from accepted standards of care, but may have been a necessary path to take for the neurosurgeon to minimise his self deprecation.

In terms of the points raised by [Mrs A] it would seem that all of the points are within good reason. I agree and empathise with [Mrs A].

The scalp markings should have been undertaken with an indelible marker so that they do not get washed off.

As neurosurgeons we know the anatomy and the location of the transverse sinus with anatomical landmarks as well as with the assistance of neuronavigation. In this situation both counts failed and resulted in the error.

I agree that the error is entirely preventable as opposed to a complication such as a post-operative haemorrhage several hours after surgery which is entirely out of one’s control.

Follow up had originally been planned however all contact was discontinued with the neurosurgeon. This may have been the option taken due to the stress caused to the surgeon in making this type of error. I am unaware of the details around this decision.

In any case [Mrs A] makes a fair comment that follow up should have been continued in particular given the error. The neurosurgeon, patient and his wife should/could have been given greater opportunity for discussion and debriefing.

I agree that in this type of more complex operation there is no doubt, it is best that the neurosurgeon remains scrubbed in theatre with the registrar from start to finish. I also agree that this approach is more likely to prevent similar errors in the future.

It would have been better if the neurosurgeon had informed the patient and family that the registrar would be involved in the case under his supervision and performing various parts of the surgery under his supervision.

Finally I would also like to suggest that a neurosurgeon will find it extremely disappointing and stressful when there is an error such as this one, and has acknowledged his responsibility and failure. The absence of the neurosurgeon for 20 minutes from the theatre at the beginning of the operation may have contributed to the error, but this fact of not being in theatre for a short period of time with a senior registrar cannot be regarded as negligence, as this practice occurs frequently in neurosurgical and other surgical/anaesthetic practice. In this case for unknown reasons, despite the normal acceptable neurosurgical processes by both the neurosurgeon and the neurosurgical registrar, an error has occurred which is not within an acceptable standard of neurosurgical care. When they realised the error they stopped the surgery.

Please do not hesitate to contact me if you require further clarification or discussion.

Kind regards

Yours sincerely

Agadha Wickremesekera MB ChB(Otago) MD FRACS  
**Neurosurgeon"**