LOCAL COURT OF NEW SOUTH WALES

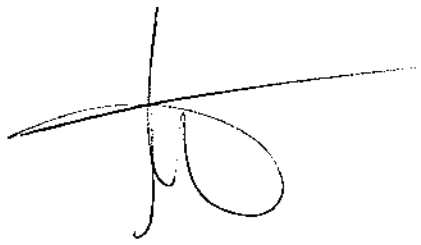
Coronial Jurisdiction

Inquest:	**Inquest into the death of** **Hellen MARSH**
Hearing dates:	31st October to 2nd November, 2016
Date of Findings:	4th November, 2016
Place of Findings:	Wollongong Local Court
Findings of:	Magistrate Geraldine Beattie, Deputy State Coroner
Findings:	I find that Hellen Marsh died on 5th November, 2013 at Wollongong Hospital, Crown Street, Wollongong, New South Wales from irreversible hypoxic brain injury sustained during surgery for meningioma resection. The manner of her death was iatrogenic with contributing natural causes.
File number:	2013/335035
Representation:	Ms Ward, Counsel Assisting the Coroner, i/b Ms Maclean of the Office of the General Counsel, Department of Justice. Mr Pike i/b Mr Brown of Browns Legal & Consulting for Dr Day, neurosurgeon. Ms McFee i/b Ms Rogerson of HWL Ebsworth Lawyers for Dr Storey, anaesthetist. Ms Boyd i/b Ms Allison of the NSW Crown Solicitor's Office, NSW for the Illawarra Shoalhaven Local Health District.

Recommendation: That a copy of the coronial findings and reasons, and the transcript of evidence be forwarded to the Chief Executive Officer of the Illawarra Shoalhaven Local Health District with a view to:

a) the findings being used to review the outcomes of the morbidity and mortality meetings (surgery and ICU) that have taken place to date; and

b) consideration of a joint review between surgery and anaesthetic representatives to discuss expectations around communication between specialities in the lead up to, and during, surgery.



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INQUEST INTO THE DEATH OF HELLEN MARSH

FINDINGS

1. Overview

Ms Marsh was 50 years old when she died on 5th November, 2013. At that time she had been living at Albion Park Cottages, a facility run by the House with No Steps, for three years, having previously spent some twelve years in one of their group homes. Ms Marsh was respected and clearly valued by her friends and carers at Albion Park Cottages and at Greenacres Industries, where she was in paid employment. While Ms Marsh had no family, having been in state care since she was eleven years old, it is clear that she was highly regarded and well-loved, and participated fully in daily and social activities.

In a letter provided by the House with No Steps to this inquest,[1] Ms Marsh is described as happy, enjoying dancing, parties and music, going to the football, and going out for dinner. She was a kind, gentle and beautiful soul who loved spending time with her friends, and is clearly sadly missed. Her carers regularly visited Ms Marsh in hospital and were with her when she died. They describe how she left an indelible mark on all their lives.

Unfortunately, Ms Marsh had a number of medical conditions. She was born with Fragile X Syndrome, a genetic condition which caused her intellectual delay and learning difficulties. In 2010 Ms Marsh was admitted to Wollongong Hospital after suffering a number of seizures at home. She was then diagnosed with an intracranial mass and told by her neurosurgeon, Dr Day, that it was a slow growing tumour. Ms Marsh was later diagnosed with epilepsy, paroxysmal atrial flutter (abnormal heart rhythm), and sub-clinical hypothyroidism.

In 2013 Ms Marsh presented to her general practitioner, Dr Michelmore, with lethargy, reluctance to attend work, and an overall feeling of sadness. Her Metoprolol was ceased, but this had no effect on Ms Marsh's low mood. In July of

[1] Exhibit 1, Tab 7.77-78

that year a carer who had known her for over ten years reported to Dr Michelmore extreme concern for Ms Marsh: the lethargy was continuing and Ms Marsh had begun to be incontinent of urine in bed. Ms Marsh's seizures and episodes of significant disorientation were also increasing.[2] A CT scan on 4th September, 2013 showed the tumour was stable in size, but with slightly more extensive oedema in the adjacent right lobe of the brain.[3] Dr Day formed the view that the only treatment option was for Ms Marsh to undergo surgery to remove the tumour,[4] and he sought and obtained approval from the Guardianship Tribunal for this operation. The surgery was originally planned for 24th October, 2013, but did not proceed as Ms Marsh had not ceased taking asprin.

On 31st October, 2013 Ms Marsh was admitted to Wollongong Hospital for her surgery. Dr Day was the surgeon and Dr Storey the anaesthetist. The plan was for a Cell Saver machine to be used during the operation to salvage Ms Marsh's blood where possible, thus allowing her blood to then be cleaned and returned to her without the need for donor blood transfusion. There are some significant differences in the two doctors' accounts of what happened immediately prior to and during the operation, and these will be discussed later.

In general terms, about two and a half hours into the procedure Ms Marsh became acutely hypotensive and the operation was halted at Dr Storey's request. At this point it was discovered that very little blood had accumulated in the Cell Saver, but that about 1,400 ml had gone to general suction waste. Cross matching and blood products were ordered and the operation continued once Ms Marsh was transfused. However, it was again halted twice more. Dr Storey's initial evidence was that he asked for the procedure to halt, but did not believe that it did.[5] This was subsequently amended to state that the procedure did halt, but not immediately.

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[2] Ms Marsh was found on the floor having fallen on 5th and 28th February, 24th and 25th June, 8th, 10th, 22nd, and 30th July, and 12th and 13th August. Her state of confusion and disorientation is particularly noted on 25th August, and 2nd, 18th and 27th September. Exhibit 1, Tab 21.502, 504, 509, 512, 518, 519, 525, 528, 535, 537

[3] Exhibit 1, Tab 2.23

[4] Exhibit 1, Tab 10.123

[5] Exhibit 1, Tab 6:68.23

Ultimately, Dr Storey's evidence was that it was possible the procedure halted a further two times.

Between the second and third stoppages Dr Day noticed a small tear near the base of the tumour, which he controlled with a clip. After the third stoppage Dr Day was able to complete the tumour and dural attachment resection and the wound was closed.

Ms Marsh had suffered an estimated blood loss of 4,500ml during this operation. Further, when the surgical drapes were removed Dr Day noticed Ms Marsh's abdomen was distended and her pupils were fixed and dilated. Ms Marsh was therefore taken for urgent brain and abdominal CT scans, which showed she was profoundly hypovolemic, and then admitted to the Intensive Care Unit. Unfortunately, Ms Marsh was unable to be revived and she died on 5th November, 2013.

A post-mortem examination by Dr McBride revealed that death was directly caused by irreversible hypoxic brain injury, in turn caused by ischaemic brain injury, intraoperative hypotension and blood loss, and the craniotomy for resection of a large planum sphenoidalium meningioma. That is: Ms Marsh suffered irreversible brain injury from lack of oxygen to the tissues, which was caused by inadequate blood flow to the brain and abnormally low arterial blood supply and blood loss during the operation to remove the tumour arising from the fibrous coverings of her brain and spinal cord.

Dr McBride also noted that the bowel was in good condition and that the extensive ischaemia noted on the post-operative abdominal CT scan appeared to be from a transient event. In his opinion, "this would favour an intra-operative hypovolemic event such that blood flow to the bowel was sufficiently compromised for sufficient time to cause acute ischaemic changes which were reversible."[6] In evidence, Dr Tan (who provided expert evidence as a Consultant Neurosurgeon) agreed with this opinion.

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[6] Exhibit 2, 2:12

However, the precise mechanism for the brain injury was the subject of significant evidentiary dispute at this inquest, and will be considered further below.

2. The nature of an inquest

The primary statutory role of a Coroner is to seek answers to the following questions: Who died? When and where did she die? What was the cause of death? What was the manner of the death? The answers to the first two questions are straightforward and not in issue. However, the focus of this inquest has been upon the manner in which Ms Marsh died and the cause of her death.

An inquest is not adversarial in nature; the proceedings are neither criminal nor civil. It is not the function of the Coroner to make formal findings of negligent behaviour. Nor is an inquest a Royal Commission with power to investigate matters more widely. If any specific or systemic failings are identified, any commentary or findings are done merely in the context of determining the manner and cause of death.

These findings are not an exhaustive summary of all the documentary and oral evidence. I have, however, taken into account all the evidence and the submissions of the parties.

3. Issues at inquest

This inquest has focussed on the circumstances that led to Ms Marsh's death. A draft list of issues was circulated prior to the commencement of this inquest. As the evidence has emerged during the inquest, these have been further distilled to the following:

a) The cause of death;

and, with regard to the manner of death:

b) The absence of a pre-operative MRI brain scan;

c) Ms Marsh's platelet count and the decisions made around surgery;

d) The failure to order cross-matching of Ms Marsh's blood prior to surgery;

e) The anticipated blood loss during surgery and communication in theatre;

f) The use of the Cell Saver device;

g) Possible injury to the right cerebral artery;

h) The adequacy of the anaesthetic records.

These issues will now be considered in turn.

3(a) The cause of death

It is clear from all the evidence that Ms Marsh ultimately died from an irreversible hypoxic brain injury that she suffered during the operation to remove her brain tumour. However, from the evidence in the coronial brief and given during the course of this inquest there is a very significant difference of opinion as to the precise mechanism of that cause, with the two most senior doctors involved in the surgery providing disparate accounts of events during the surgery and experts drawing various inferences from the evidence.

It is firstly argued that the hypoxia was the result of acute vascular injury, causing ischaemia of the right cerebral hemisphere, a marked midline shift, and coning. The suggestion is that the right anterior cerebral artery was accidentally nicked during the surgery, thereby causing catastrophic vascular assault - a suggestion vehemently denied by Dr Day, who also states there was just a slow, constant bleed throughout the procedure.

The second argument is that the hypoxia was caused by hypovolemia: Ms Marsh suffered an unobserved blood loss in excess of 1,400ml during the first half of the surgery and, ultimately, an estimated 4,500ml throughout the entire procedure. The suggestion is that blood collected in all three suction devices (not just the Cell Saver) should have been better monitored – a suggestion rejected by Dr Storey, who states he had no cause to check the general suction containers. Alternatively, the precise cause of the hypoxia may have been a combination of both scenarios.

In order to favour one of the specific causes of death over the others I need to be comfortably satisfied that the finding was made out, having regard to the *Briginshaw* standard. However, the evidence available at inquest to reliably assist in determining

the precise mechanism of death is very limited. At autopsy, the brain was very soft and partially disintegrated on handling.[7] The pathologist also noted that, "most of the histological changes of the brain...occurred post-operatively but before death. The time lapse between the date of the operation and the date of death meant that it was difficult at autopsy to determine what was primary damage or secondary damage."[8] Without that evidence, there are only possible inferences that could be drawn from the pre and post-operative CT scans, the operation and anaesthetic notes, and the cross-examination of the two doctors three years after the operation.

I cannot be comfortably satisfied on this evidence as to the precise cause of death, and therefore simply find that the cause of death was irreversible hypoxic brain injury sustained during surgery for meningioma resection.

3(b) The absence of a pre-operative MRI brain scan

Dr Tan is critical of Dr Day for using CT scans rather than an MRI scan in preparing for this operation.[9] Dr Day appears to have agreed with Dr Tan that, ordinarily, a preoperative MRI and a CT contrast scan could be useful for this type of surgery. Such tools would enable the surgeon to have as much detail as possible about the size, location and vascularity of the brain tumour.

However, in this case, Dr Day used a Brainlab protocol CT scan with contrast to prepare for the surgery. He states that this "allowed for 3 dimensional reconstruction of the brain and brain vascular supply including details of vascular supply in proximity to the tumour."[10] In evidence he explained how he used the Brainlab during the surgery as an anatomical confirmation system to show where he was operating, relative to other parts of the brain anatomy. In this way he believed he could see as much, if not more, using the CT than he could have with an MRI. Dr Tan had no relevant experience using the Brainlab equipment and could not comment on this. Therefore it cannot be determined whether an MRI would actually

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[7] Exhibit 2, 1:6

[8] Exhibit 2, 2:7

[9] Exhibit 1, Tab 4A:49B, 49D

[10] Tab 5A:59A

have produced information of more relevance than that obtained using the Brainlab and CT scan.

Significantly, Dr Day also explained why he chose not to order an MRI prior to surgery: Ms Marsh was clearly very fearful of going to hospital, and had been unable to tolerate an MRI in 2010 despite being given sedation. In contrast to a CT scanner, an MRI is very noisy, takes a lot longer, and requires the patient to remain still on a table within the machine, often causing feelings of claustrophobia. Ms Marsh's intellectual disability meant she was unable to give informed consent to medical procedures and her fears around medical treatment and going to hospital were particularly difficult to allay. While it was possible for an MRI to be conducted on a patient under general anaesthetic, as Dr Tan suggested, for Ms Marsh this would have meant another unwanted hospital admission.

Dr Day's concern about inflicting an MRI on Ms Marsh is supported by her anxiety in other medical settings: in 2012 a dentist was unable to clean Ms Marsh's teeth and there was discussion about using a relaxant for her dental appointment;[11] in June 2013 a CT was only able to be completed because of the particular skill of the radiographer in helping her to understand what was happening and how she would feel;[12] on 30th October, 2013 she provided only limited co-operation when undergoing an EEG.[13]

Given the lack of certainty that using an MRI would have provided better and more relevant information and the particular circumstances of Ms Marsh, Dr Day's decision to use the Brainlab protocol with CT contrast scans was both a considered and appropriate one.

3(c) Ms Marsh's platelet count and the decisions made around surgery

A significant part of the evidence at this inquest concerned Ms Marsh's low platelet count and whether her surgery should have been postponed until her platelet levels increased. Throughout 2013 Ms Marsh's platelet count was below 100,000 and

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[11] Exhibit 1, Tab 24:605

[12] Exhibit 1, Tab 24:594

[13] Exhibit 1, Tab 8:79

slowly decreasing. The reference range for platelets is 150 to 450. By the time of Ms Marsh's surgery the decreasing platelets had become chronic, having reached a nadir of 78,000 on 10th October in the blood testing ordered by Dr Michelmore.[14] The evidence does not explain why these levels were decreasing.

Platelets perform an important clotting function in the blood and concern is expressed by A/Prof. Molloy, who provided evidence as an expert anaesthetist, that this may further increase the risk of bleeding in an operation that was well known to be associated with significant risk of bleeding.[15] At the same time, there is also evidence that Ms Marsh's coagulation profile was within reference at the time leading to her operation.[16]

Unfortunately, the evidence shows that there was a period of coagulopathy between the second and third occasions on which Ms Marsh's surgery was halted. The evidence also shows that she lost an estimated 4,500ml of blood during the course of the operation; her estimated blood volume, based upon her weight, was 3,300ml according to A/Prof. Molloy[17]. The blood loss is a significant amount, even allowing for an estimated blood volume of four to five litres, as was accepted by Dr Tan in his cross-examination.

Dr Storey stated that he had expressed his concern over Ms Marsh's low platelet count to Dr Day immediately prior to the surgery commencing. Dr Day does not recall that conversation.

Dr Tan expressed a firm view based upon his training and experience that if the platelet count is below 100,000, elective brain surgery should be cancelled until the count is corrected.[18] He clearly would not have operated in these circumstances.

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[14] Exhibit 1, Tab 15:349

[15] Exhibit 1, Tab 4:33

[16] Exhibit 1, Tab 9:99-100

[17] Exhibit 1, tab 4:29

[18] Exhibit 1, Tab 4A:49D

A/Prof. Molloy quoted the Red Cross recommendation that for head/spinal surgery the platelet count should be maintained greater than 100,000.[19]

In contrast, Dr Day stated that "it is well known that it is possible to safely perform surgery, even intracranial surgery, with a platelet count of 50,000 or greater."[20] In his view, platelet function is more important than platelet count, but this is not regularly measured in Australia. In evidence he acknowledged Dr Tan's threshold of 100,000, but concluded that it was a difference of professional opinion and that either position could be supported with the published literature.

Dr Day and Dr Tan have had different training and experience, and there is no firm rule that overrides the exercise of clinical discretion in this regard. Different professional minds clearly differ. It is apparent that Dr Day's clinical decision to proceed with the operation was informed by his training and experience, Ms Marsh's normal coagulation results, her deteriorating quality of life as a result of the tumour, her fear of hospitals and medical appointments, and the fact that surgery had already been cancelled once.

3(d) The failure to order cross-matching of Ms Marsh's blood prior to surgery

Ms Marsh had a Group Screen and Hold done prior to her surgery, which typed her blood. However, her blood was not cross-matched for compatibility with available donor blood products before her surgery commenced. Dr Day explained in his evidence that, while it would be prudent to do so if blood products were in unlimited supply, cross-matching is not routinely ordered. This is because, once matched, the donor blood is made available for the patient in the theatre and is thereby unavailable for use elsewhere.

In this particular case Dr Day intended to use the Cell Saver and thus limit the need for donor blood products. This was a further, relevant factor informing his decision not to order cross-matching.

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[19] Exhibit 1, Tab 4:32

[20] Exhibit 1, Tab 5A:59A

Dr Storey's evidence is that the cross-matching process can take some ten to fifteen minutes once those in the theatre are aware of the blood loss. As there is no suggestion that such a delay was critical in all the circumstances of Ms Marsh's case, this issue is ultimately not a significant one in this inquest.

3(e) The anticipated blood loss during surgery and communication in theatre

This was another significant issue. Dr Day anticipated that Ms Marsh would suffer blood loss during surgery.[21] He stated in evidence that there was significant potential for large blood loss with brain surgery, particularly here where it involved the resection of a vascular meningioma. However, he clearly did not anticipate the very high level that occurred here.

In contrast, Dr Storey did not anticipate such blood loss. According to his statement, in his experience meningiomas do not tend to lose a lot of blood during their removal.[22] In evidence he conceded that he was aware that these procedures carried a significant *risk* of bleeding, depending upon the size, location and vascularity of the tumour. However, he was not told that this operation carried such risk.

This difference in expectation of blood loss is significant because it may have prevented Dr Storey from appreciating in the early stages of the operation that the relatively low level of blood collected in the Cell Saver was cause for concern.

From a lay perspective, the lack of communication between surgeon and anaesthetist about the operation that was about to be performed is confounding. However, Dr Day and Dr Storey had been working together for some eleven years prior to Ms Marsh's operation. It may well be that they therefore felt there was no need for any discussion or briefing. As Dr Day stated, given Dr Storey's experience with him, he did not consider it his role to instruct Dr Storey about the risk of significant bleeding.

Nonetheless, there clearly should have been better communication from each of the doctors to the other prior to surgery commencing. This would have enabled Dr

[21] Exhibit 1, Tab 5:54.5

[22] Exhibit 1, Tab 6:68.22

Storey to have sufficient information about this tumour and the operation to have an informed idea as to the anticipated blood loss. If he was not given this information by Dr Day, he should have actively sought it.

This lack of communication appears to have continued during the operation, with no overt communication as to whether the Cell Saver suction or the general suction was being used. Dr Day was unable to remember if he told the anaesthetic team when he was switching between suction units. However, he stated that typically he would put the Cell Saver suction down and the Cell Saver operator would notice this; it thus would not add any information to what could already be seen if he were to say he was using particular suctions.

Had there been communication between the teams about whether the Cell Saver suction was being used during the course of the surgery, it may have alerted the anaesthetic team to the issue of the low volume of blood in the Cell Saver container.

However, at the same time, while the Cell Saver was to be the primary suction device, Dr Storey was aware it would not be the exclusive suction device. To accurately and reliably assess Ms Marsh's blood loss, Dr Storey was required to visually assess the general suction devices as well as the Cell Saver. Because of the layout of the operating theatre, with one of the general suction devices being placed behind the surgeon and both being partially obscured by the surgical drapes,[23] this meant Dr Storey had to stand up to see them. Unfortunately, he did not do this until prompted by a rise in Ms Marsh's heart rate without any corresponding drop in blood pressure.

In retrospect it appears that, had there been better communication between the surgical and the anaesthetic teams, there may have been a better outcome for Ms Marsh.

3(f) The use of the Cell Saver device

By using the Cell Saver to effectively cleanse and recycle Ms Marsh's blood back into her system, Dr Day explained that he hoped to spare her the risks associated with

[23] Exhibit 1, Tab 5A:59B; Tab 5A:59E; Tab 6:75C

the transfusion of donor blood. His decision to use this device was not challenged during the inquest and appears to have been a sensible one in all the circumstances.

The difficulty the Cell Saver posed during this inquest was the conflicting oral evidence about how it was used. Indeed, the dispute between the written accounts by Dr Day and Dr Storey about the Cell Saver widened further during the course of evidence.

Dr Day was adamant that, when surgery was first halted, he was told that there was no Cell Saver blood available to give to Ms Marsh because the Cell Saver was not adequately or appropriately connected and the collected blood was contaminated and could not be used. He also described how he became angry and shouted when he was told that the device could not be used for the rest of the procedure. Dr Day was also clear in his explanation that the Cell Saver suction line looks and feels obviously different to the general suction lines, the inference being that he would not have confused the two. However, he is unable to explain how Ms Marsh was able to be given the 83ml of Cell Saver blood at 16:00 and a further 443ml at 16:45.[24]

Dr Storey was equally adamant that the surgical team were using the general suction device during the first two and a half hours of the operation and that the Cell Saver was hardly used at all. He supports his position by stating that when he was concerned by the rising heart rate without any concurrent drop in blood pressure and stood up he saw about 700ml of blood in each of the general suction units. This was in stark contrast to the Cell Saver device, which only held less than 150ml.

These extraordinarily disparate accounts cannot be resolved on the available evidence. Noting the limits of an inquest, as opposed to a wider reaching internal inquiry, deliberate decisions were made to confine the scope of the evidence and issues. Accordingly, other personnel in the operating theatre three years ago were not asked to provide evidence and no criticism can be made of them.

However, it appears that, despite morbidity and mortality meeting discussions about this case and investigations within the hospital, these significantly different versions of what took place in the operating theatre on 31st October, 2013 have not been

[24] Exhibit 1, Tab 10:276-277

elicited until this inquest. Similarly, it is apparent from the evidence that Dr Day and Dr Storey have not spoken to each other to try to understand each other's perspectives and what went wrong in the theatre. Given the significance of the differences in accounts and the lack of communication on the day, it is important that there be opportunities for the detail to be examined further by the body best placed to do so – the hospital - and for lessons to be learned and shared with a view to better informing future conduct.

3(g) Possible injury to the right cerebral artery

Dr Tan initially provided an opinion that, "the Surgeon more than likely accidently nicked the right anterior cerebral artery" and thus lost blood control.[25] He based this opinion on his observations of the post-operative CT scan, which he stated showed severe right cerebral hemisphere swelling as a result of the surgery, the degree of blood loss, and his experience of how easy it was to both accidentally cut a blood vessel while removing a tumour such as this and to not notice such a tiny hole. As noted above, Dr Day strongly denied that this occurred: the artery was not damaged in that way, and he did not observe the type of bleeding he would expect if such an injury had occurred.

The evidence is insufficient to make a positive finding that there was an accidental injury to the right cerebral artery. Firstly, the brain was in such a poor state at autopsy that it could not be examined at a level that may have confirmed or refuted Dr Tan's opinion. Secondly, Dr Tan agreed in evidence with Dr Day's opinion that the post-operative CT scan would not show hypoxic changes because it was too early for them to appear. Finally, Dr Tan readily agreed in evidence that Dr Day was the only person who could describe the blood loss because he was the surgeon performing the operation, and that Dr Day was in the best position to give evidence about this issue.

I therefore make no finding in relation to this issue.

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[25] Exhibit 1, Tab 4A:49C

3(h) The adequacy of the anaesthetic records

A/Prof. Molloy was critical of the anaesthetic record-keeping for this procedure, noting that significant data was missing from the handwritten anaesthetic chart. Such data included actual dosages or infusion rates of drugs, hourly urine output, temperature, end tidal carbon dioxide (recorded for only half the duration of surgery), and regular measurements of blood gas.[26]

Dr Storey frankly conceded that the written record is not the complete anaesthetic record, but explained how this does not mean that such markers were not actually measured during the procedure. The urine output was in fact collected and appropriately recorded in the separate daily fluid balance chart; the anaesthetic machine continually monitored patient temperature and a default alarm would sound if the temperature fell below 35.5 degrees; it was his practice to measure blood gas when there was a reason to do so, in order to see how acidotic the patient was. Dr Storey had previously explained that the targeted effect-site concentration and infusion rates of drugs varied and were titrated during the procedure according to Ms Marsh's condition; it was therefore his usual practice to only record the total doses given on the chart.[27] He also similarly noted that the end tidal carbon dioxide levels were monitored throughout the procedure and he normally recorded these on the chart later.[28]

It is very clear that the emergency events during surgery and the need to get Ms Marsh to radiology and then to the intensive care unit took precedence over obtaining data from the anaesthetic machine and writing it up in the anaesthetic chart. At the time there was no printer in the theatre and the available printer, according to Dr Storey's evidence, was old and did not really work. The data in the anaesthetic machine is overwritten after a certain period of time, and therefore could not later be retrieved.

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[26] Exhibit 1, Tab 4:29

[27] Exhibit 1, Tab 6:66.15

[28] Exhibit 1, Tab 6:68.20

A/Prof. Molloy accepted that procedures such as only recording total doses of medication were common, but expressed a view that it was not the best practice particularly where, as here, things went wrong and records were not obtained that may have assisted in giving a better picture of what was happening to Ms Marsh in the theatre. It is precisely in complex matters such as this, where procedures take an unexpected turn, that anaesthetic records are of particular importance. A/Prof. Molloy emphasised the importance of recording matters on the anaesthetic chart, "as you go."

4. Changes since Ms Marsh's Death

Dr Storey gave evidence of two relevant changes that have occurred in the operating theatre since October 2013. Firstly, while the general suction devices remain in the same location, there are now visible screens above them showing important information such as the volumes collected. The Local Health District has advised that the location of all surgical suction devices has changed and that all surgical suctions must be in the anaesthetist's line of sight.[29]

Secondly, there are new anaesthetic machines now and these are networked and can therefore easily produce print-outs of data. While the anaesthetic chart is currently unable to be uploaded into the electronic medical record due to software issues, at least there is real-time recording of the data.

Dr Storey described both of these changes as significant improvements. In the particular circumstances of this case, each development appears appropriate.

5. Conclusion

Ms Marsh died as a result of complications that occurred during her surgery. Yet, without this surgery, Dr Day's evidence is that the tumour would have continued to impact on Ms Marsh and the quality of her daily life, slowly and consistently causing it to deteriorate to the point of death.

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[29] Exhibit 1, Tab 17:389A

The complications during her surgery were unexpected and clearly life-threatening. In the midst of that emerging medical crisis those who treated her had to make urgent decisions and act very quickly. Once alerted to the emergency, it appears that both Dr Day and Dr Storey acted appropriately in struggling to keep Ms Marsh alive. In doing so they were operating under extreme clinical pressure, and it is very important to keep this context in mind in considering what occurred on 31st October, 2013.

We all appreciate the benefit of hindsight; it is easy to be critical when wearing those 'glasses', but such 'looking backwards' provides opportunities to change current practices with a view to improving the care, treatment and outcomes of others in a position similar to Ms Marsh.

At inquest, with the benefit of all available evidence, we can point out problems and be critical of choices made. However, in this particular case with the deficiencies and contradictions in the evidence, such a process does not really achieve a great deal. Here, a known risk occurred during a difficult operation and, notwithstanding the best endeavours of both specialists to address the problem, there was an adverse outcome resulting in the untimely death of a well-loved, contributing and valuable member of our society.

6. S.81(1) Findings

As a result of considering all of the documentary evidence and the oral evidence given at inquest, I make the following findings in relation to this death:

Identity of deceased: Hellen Marsh.

Date of death: 5th November, 2013.

Place of death: Wollongong Hospital, Crown Street, Wollongong, New South Wales.

Cause of Death: Irreversible hypoxic brain injury sustained during surgery for meningioma resection.

Manner of Death: Iatrogenic with contributing natural causes.

7. Recommendations

Coroners have power, pursuant to s.82(1) of the *Coroners Act 2009*, to make recommendations that they consider are necessary or desirable to make in relation to any matter connected with a death investigated by inquest. It is a broad power that is not to be used lightly; recommendations need to be targeted and thoughtful.

In light of my findings on the issues before this inquest and the emerging state of the evidence, I consider there is scope for the making of recommendations to enable the hospital to try to understand Dr Day and Dr Storey's disparate accounts about the use of the Cell Saver during the first part of the operation. It appears that the hospital may not have been aware of this disparity – clearly the minutes of the morbidity and mortality meetings for the surgical and intensive care teams do not accurately reflect the problem with the Cell Saver device in Ms Marsh's case. I simply do not know if there has been any discussion focussing on the important issues that have emerged during the course of this inquest, or that any relevant learning has resulted.

The evidence at this inquest has raised concerns about communication issues including lack of information sharing about the tumour prior to the surgery, the relevance of the low platelet count, the use of differing suction devices, and observations of blood collection and loss. It is therefore apparent that there would be considerable benefit if this case could be discussed in a joint forum with a view to improving communication and expectations that each specialty (surgery and anaesthesia) has of colleagues in the other.

I therefore make the following recommendation:

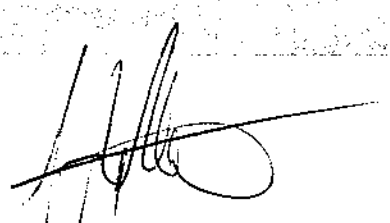
> That a copy of the coronial findings and reasons, and the transcript of evidence be forwarded to the Chief Executive Officer of the Illawarra Shoalhaven Local Health District with a view to:
>
> a) the findings being used to review the outcomes of the morbidity and mortality meetings (surgery and ICU) that have taken place to date; and

b) consideration of a joint review between surgery and anaesthetic representatives to discuss expectations around communication between specialities in the lead up to, and during, surgery.

Acknowledgment

I thank Ms Ward and Ms Maclean for their assistance with this inquest, particularly in confining the issues as the evidence emerged. Ms Ward's closing submissions have been of considerable assistance in preparing these findings.

SIGNATURE

Signature	
Name	Geraldine Beattie
Capacity	Deputy State Coroner Wollongong
Date	4th November, 2016.