

Southern District Health Board

A Report by the Health and Disability Commissioner

(Case 12HDC01133)



Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

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Executive summary

Background

1. In 2012 Mr A, aged 87 years, was admitted to hospital. Mr A had been feeling unwell for approximately six weeks, was experiencing lower abdominal pain, and had been vomiting black bile.
2. On Day 4¹ of his admission a CT scan indicated a diagnosis of gallstone ileus,² and Mr A was referred for a laparotomy³ and removal of his gallstone. Prior to surgery, it was noted that Mr A was at risk of aspiration.⁴
3. On the evening of Day 4, Mr A's condition deteriorated rapidly. Clinical staff advised Mr A's family that there were high risks involved with Mr A's surgery and that, while he would be admitted to the Intensive Care Unit (ICU) postoperatively, limits would be placed on the level of support he would receive.
4. At 11.37pm, a preoperative chest X-ray (CXR) showed evidence of likely aspiration pneumonitis,⁵ and it was agreed that Mr A required surgery that night due to his deterioration. In theatre, a central venous line⁶ was inserted. The surgery took approximately one hour, and Mr A was transferred to ICU.
5. During handover to the ICU team, the anaesthetic team advised that Mr A would require a postoperative CXR for confirmation that the central venous line had been placed correctly. The anaesthetic team also advised that Mr A was currently having oxygenation and ventilation problems.
6. The associate charge nurse of ICU, Registered Nurse (RN) Ms N, ordered a postoperative CXR for Mr A. ICU RN M and RN N assessed Mr A and considered possible causes of his poor oxygenation, including a pneumothorax⁷ or aspiration pneumonia.⁸ Both RNs concluded that his presentation was consistent with having aspirated prior to surgery, and that he was developing aspiration pneumonia.
7. At 3.24am on Day 5, the postoperative CXR was performed by radiology. It was not reviewed by any member of clinical staff until over 24 hours later.
8. Mr A continued to deteriorate, and ICU registrar Dr K maintained regular phone contact with the consultant on call, Dr L. Dr L did not specifically ask Dr K for the results of the postoperative CXR.
9. At 8.15am, the ICU night team handed over to the day team, including ICU consultant Dr O. The night team informed the day team that Mr A had aspirated prior to his

¹ Relevant dates are referred to as Day 1 – Day 6 to protect privacy.

² Obstruction of the bowel due to impaction of one or more gallstones.

³ A surgical incision into the abdominal cavity to examine the abdominal organs.

⁴ Inhalation of material such as food.

⁵ Inflammation of the lung caused by inhalation of regurgitated gastric contents.

⁶ A catheter placed into a large vein in the neck, chest, or groin. It is used to administer medication or fluids, obtain blood tests, and measure central venous pressure.

⁷ Collection of air or gas in the pleural space causing the lung to collapse.

⁸ Inflammation of the lung following inhalation of foreign matter such as gastric contents or oral secretions.

surgery, and that discussions with Mr A the previous evening had suggested that Mr A was aware of the severity of his condition, and was “quite resigned to the fact that he might die”.

10. Dr O convened an urgent meeting with Mr A’s family and subsequently implemented palliative care for Mr A. After active treatment had been withdrawn, Mr A died at approximately 1.50pm on Day 5.
11. On Day 6, Mr A’s X-rays were reviewed at a regular multi-disciplinary radiology meeting. The postoperative CXR showed a large tension pneumothorax,⁹ which had not previously been detected by any member of staff. Southern District Health Board (SDHB) concluded that the tension pneumothorax had contributed to and “possibly directly caused” Mr A’s death.

Decision summary

12. A number of failures led to Mr A receiving suboptimal care and treatment. While individual health professionals must take some responsibility for the failures that occurred, largely they were a result of service-level failures by SDHB.
13. SDHB failed to provide clear direction to staff about management and review of postoperative care. As a result, SDHB, through its staff, failed to undertake a timely review of Mr A’s postoperative CXR. Further, SDHB was responsible for the ICU team failing to consider differential diagnoses for Mr A. SDHB did not provide services to Mr A with reasonable care and skill and, accordingly, breached Right 4(1)¹⁰ of the Code of Health and Disability Services Consumers’ Rights (the Code).
14. SDHB was also responsible for the failures by its staff to communicate adequately with each other regarding Mr A’s condition. The failure to communicate affected the quality and continuity of services provided to Mr A. Accordingly, SDHB breached Right 4(5)¹¹ of the Code.
15. Adverse comment is made regarding Dr K as the clinician who had primary responsibility for reviewing Mr A’s postoperative CXR.
16. Regarding Dr O, further adverse comment is made that clinicians should always ensure they are aware of relevant information when making decisions regarding withdrawal of active treatment or commencement of palliative care.

⁹ In a minority of cases, a pneumothorax can progress to a tension pneumothorax, where the amount of air in the chest increases markedly when a one-way valve is formed by an area of damaged tissue. Tension pneumothorax is considered a medical emergency that can cause steadily worsening oxygen shortage and low blood pressure.

¹⁰ Right 4(1) states: “Every consumer has the right to have services provided with reasonable care and skill.”

¹¹ Right 4(5) states: “Every consumer has the right to co-operation among providers to ensure quality and continuity of services.”

Complaint and investigation

17. The Commissioner received a complaint from Ms B regarding the care provided to her late father-in-law, Mr A, by the Southern District Health Board, while in the care of a public hospital. The following issue was identified for investigation:

- *Whether the Southern District Health Board provided an appropriate standard of care to Mr A in 2012.*

18. An investigation was commenced on 30 September 2013.

19. The parties directly involved in the investigation were:

Ms B	Complainant/Consumer's daughter-in-law
Southern District Health Board	Provider

20. Information was also reviewed from:

Ms D	Mr A's daughter
Mr E	Mr A's son
Dr F	Consultant surgeon
Dr G	Surgical registrar
Dr H	Consultant surgeon
Dr I	Anaesthetic registrar
Dr J	Anaesthetic consultant
Dr K	ICU registrar
Dr L	ICU consultant
RN M	ICU registered nurse
RN N	ICU associate charge nurse
Dr O	ICU consultant
Dr P	ICU registrar

Also mentioned in this report:

Dr Q	Surgeon and ICU consultant
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21. Independent expert advice was obtained from an anaesthetist and consultant in intensive care medicine, Dr Ross Freebairn (**Appendix A**), and HDC's in-house nursing advisor, registered nurse Ms Dawn Carey (**Appendix B**).

Information gathered during investigation

Admission to the public hospital

22. In 2012, Mr A, aged 87 years, arrived at the Accident and Emergency Department (A&E) with his family. Mr A had been feeling unwell for approximately six weeks and had a history of heart failure and atrial fibrillation. Mr A's daughter-in-law, Ms B,

advised HDC that Ms D arrived at A&E with Mr A at 2.30pm, and that Mr A waited for five hours before being examined. However, it is recorded in Mr A's triage notes that at 4.56pm he was assessed as experiencing lower abdominal pain, and it was noted that he had been vomiting black bile.

23. At 7.02pm Mr A was seen by an A&E doctor. SDHB admission notes record that Mr A had a large but reducible hernia, and that he had "opened his bowels" on the day of admission. Mr A's abdominal examination was recorded as "abnormal", and he was admitted under the care of a gastrointestinal surgeon, Dr F.
24. On the morning of Day 2 Dr F assessed Mr A. Dr F recalls that many of Mr A's initial symptoms seemed to have settled, and there had been no further vomiting since his admission.
25. On the evening of Day 3, Mr A experienced increased pain and further vomiting. Blood was taken for testing, and Dr F requested a CT (computed tomography)¹² scan. At 3.30pm on Day 4 the CT scan was performed and indicated a diagnosis of gallstone ileus.

Referral for surgery

26. On the afternoon of Day 4, Mr A was referred for a laparotomy and removal of his gallstone. Dr F was unavailable to perform the surgery, so discussed handover of care of Mr A with consultant surgeon Dr H. Dr H reviewed Mr A's CT images and noted that there was a risk of aspiration. After speaking with Dr F, Dr H met with Mr A, at approximately 4.20pm.
27. Dr H explained Mr A's upcoming surgery to Mr A and his family. Dr H then inserted a nasogastric tube¹³ and drained approximately 2000ml of brown fluid. Mr A was booked for surgery between 8–9pm, but this had to be delayed because a more urgent case intervened.

Discussion regarding life-prolonging treatment

28. At approximately 11.15pm, nursing staff alerted the surgical team to a rapid deterioration in Mr A's condition. An Intensive Care Unit (ICU) consultant, Dr L, stated that Mr A appeared "somewhat confused, not being quite oriented about the situation and place ... [Mr A] confirmed that the [nasogastric] tube had significantly improved his breathing."
29. Dr L and ICU registrar Dr K had an urgent discussion with Mr A's family, advising them that there were high risks involved with Mr A's surgery, including that he was an elderly patient with a history of heart failure and atrial fibrillation, and that he had been unwell with bowel obstruction for a few days. Dr L and Dr K considered that there was a high chance that Mr A might not survive surgery. Clinical notes signed by Dr K stated:

¹² X-ray imaging used to create cross-sectional pictures of the body.

¹³ A tube inserted through the nose into the stomach.

“Seen 2 sons, explained the high risks involved in emergency surgery and post operative ICU stay in octogenarian. Both sons fully understanding that [Mr A] is very frail and that he has been getting increasingly more frail in recent weeks.

...

Explained that surgery was very high risk but that we would support on ICU, if he shows signs of deterioration we would instigate some limits to his level of support earlier rather than later. All family members would support this approach and understand that he may not survive this acute episode.”

30. Mr A’s son, Mr E, advised HDC that he and his brother were present at the discussion with Dr K and Dr L. Mr E recalls gaining the impression that “it was better that [his father] underwent surgery than not” at that stage. He said that both he and his brother agreed to their father undergoing surgery.
31. Dr K advised HDC that he felt that although Mr A was “slightly confused”, he understood the risks associated with surgery.
32. ICU RN M advised HDC that ICU was consulted prior to Mr A going to theatre, and had formally agreed to manage him postoperatively “should he survive the operation”. RN M stated:

“[T]he ICU had been notified regarding this probable admission, given his diagnosis, age and co-morbidities as well as the comment that this gentleman was extremely ill with a poor chance of survival.”

33. At 11.37pm a preoperative chest X-ray (CXR) was taken and reviewed by the ICU team. There was evidence of likely aspiration pneumonitis, and it was agreed that Mr A required a laparotomy that night because of his deterioration. Dr H stated to HDC that the longer surgery was delayed, the more likely it was that Mr A’s condition would continue to deteriorate.

Anaesthetic team

34. Prior to surgery, an anaesthetic registrar, Dr I, inserted a central venous line using ultrasound guidance. Consultant anaesthetist Dr J advised HDC that everything carried out by the registrar in theatre was done under his direct supervision and with his approval. Dr J stated that the insertion of the central line appeared to be “straightforward”.
35. In the early hours of Day 5, Dr H operated on Mr A. Dr H stated that the entire procedure took approximately one hour, and appeared to proceed very smoothly and without incident. However, Dr J stated that Mr A “became unstable during surgery”, suffering from atrial fibrillation.¹⁴ At the conclusion of the laparotomy Mr A was transferred to ICU.

¹⁴ Rapid and chaotic heartbeat.

ICU team — night shift

36. ICU associate charge nurse RN N told HDC that she was present at handover from the anaesthetic team, together with RN M and Dr K. RN N advised HDC that the anaesthetic team told the ICU team that Mr A had been unstable intra-operatively and was currently having oxygenation and ventilation problems. Dr J advised that the anaesthetic team informed the ICU team that Mr A would require a postoperative CXR for confirmation that the central venous line had been placed correctly. Dr J stated to HDC that handover of a patient is “critical to our mission as acute theatre anaesthetists ... after the hand over our attention turns to the next urgent patient”.

Postoperative CXR

37. RN N advised HDC that it is standard practice to obtain a CXR “as soon as is practicable” following an ICU admission. When Mr A arrived at ICU, RN N completed an X-ray referral form for an “urgent” postoperative CXR in order to check line placement, and paged radiography staff. RNs M and N assessed Mr A for possible causes of poor oxygenation, as had been advised by the anaesthetic team.
38. RN M recalls specifically considering the possibilities of a pneumothorax, aspiration pneumonia and pulmonary oedema,¹⁵ but this was not recorded in the clinical notes. RN N advised HDC that she discussed these possibilities with RN M, and that she and RN M independently assessed Mr A, including auscultating¹⁶ his chest for the presence of abnormal breath sounds.
39. Both RN M and RN N stated that on listening to Mr A’s chest they noted that breath sounds were significantly quieter in his right-hand side. RN M performed tracheal suctioning, removing dark brown sputum consistent with aspiration. RN M advised HDC that the finding of dark brown sputum, along with preoperative findings regarding aspiration,¹⁷ led her and RN N to conclude that Mr A was developing aspiration pneumonia.
40. Dr K performed a bedside echocardiogram¹⁸ (ECHO) on Mr A. Dr K stated that “[t]he ECHO showed what appeared to be reasonable function with both ventricles moving reasonably well”. Clinical notes at 3.15am state:

“dilated RV [right ventricle] — However LV [left ventricle] function appeared reasonable! ... Also on suctioning matter = dark purulent! Appears to be small bowel contents consistent w [with] aspiration as [opposed] to pulmonary oedema
...

significant respiratory failure 2ndary to aspiration of SB [small bowel] contents earlier today ... sedate for ETT [endotracheal tube] tolerance. — rpt [repeat] ABG [arterial blood gases] 20 mins. — consider APRV¹⁹.”

¹⁵ Accumulation of fluid in the lungs.

¹⁶ Listening to the internal sounds of the body, usually using a stethoscope.

¹⁷ As noted above, Mr A’s preoperative CXR showed evidence of likely aspiration pneumonitis.

¹⁸ A test using ultrasound waves to create a moving picture of the heart.

¹⁹ APRV (airway pressure release ventilation) is a mode of ventilation used for severe hypoxaemic respiratory failure.

41. Mr A continued to deteriorate overnight, and Dr K maintained regular telephone contact with Dr L, who was on call, regarding Mr A's condition. At approximately 3.30am Dr K reported to Dr L the results of the bedside echocardiogram, and discussed Mr A's respiratory failure. Dr K advised Dr L that he would change the mode of ventilation being used for Mr A to APRV, and to add adrenaline should Mr A's blood pressure remain low. Dr L told HDC that he supported this decision. Dr K recorded in the clinical notes:

“[Discussed with] ICU Consultant [Dr L] informed of patient significant respiratory failure. — Suggested trying APRV.”

42. At 3.24am radiology performed Mr A's post-operative CXR. However, the X-ray was not reviewed by any member of clinical staff until over 24 hours later, after Mr A had died.
43. At approximately 5am, Dr K spoke to Dr L again and advised that there had been no real improvement in Mr A's condition. Dr L suggested increasing the adrenaline further and adding hydrocortisone²⁰ and vasopressin²¹ if the current combination of noradrenaline²² and adrenaline was not sufficient. Dr L stated that Mr A's postoperative condition was so consistent with his preoperative CXR that he did not specifically ask Dr K for the results of the postoperative CXR.
44. Dr K told HDC that he was not aware that a postoperative CXR had been taken in ICU. He said:

“[I]t would be standard practice for the bedside nurse to ask the doctor to check the X-ray as they cannot start parenteral feeds or any infusions down a central line without the CXR being checked to ensure correct placement ...”

45. Dr K stated that he was not asked to review the postoperative CXR at any stage.
46. In response to the provisional opinion, RNs N and M commented on Dr K's statement that they could not begin feeds or infusions down the central line without first checking the line placement. The RNs said that when patients have had a central line placed and used while in theatre, they can continue to use the line in ICU. However, they stated: “But of course this doesn't change the fact that it is normal practice to do a post-op X-ray for tube and line placements.”

ICU team — day shift

Commencement of palliative care

47. At approximately 8.15am, ICU consultant Dr O came on shift as the intensive care consultant. ICU registrar Dr P was also present during handover from the night shift ICU team. He stated to HDC that he and Dr O were informed that Mr A had aspirated prior to his surgery. Dr K said that during handover, “the issue was raised regarding

²⁰ A steroidal drug used to treat inflammatory conditions.

²¹ An antidiuretic hormone.

²² A hormone used to treat life-threatening drops in blood pressure.

withdrawal of active treatment. I stated that I had explained to [Mr A's] family ... that he was not responding well and that I would ensure that the day consultant spoke to them about on-going plans. I was not asked about the CXR by anyone present at the morning handover ...”

48. Dr O said that Dr K told him at handover that discussions between Mr A and Dr L the previous evening had suggested that Mr A was aware of the severity of his condition, and was “quite resigned to the fact that he might die”. Dr O further stated that he was “led to believe that limits of care ... had been imposed prior to [Mr A's] operation”.
49. Dr L told HDC that he was not present for the handover to Dr O. However, he stated that at around 9.15am he called Dr O to update him on Mr A's care, and specifically mentioned the conversation he had had with the family the previous evening about limiting therapy for Mr A.
50. Dr O advised HDC that after that discussion, he convened an urgent meeting with Mr A's family. Dr O said that he “portrayed what [he] believed to be the case — shock secondary to aspiration [and] peritoneal sepsis²³ as a consequence of gallstone ileus”. Dr O stated that Mr A's family were “in complete agreement that [Mr A's] interests were not served by a prolonged hospital ... admission”, which Dr O felt was inevitable if Mr A survived, and that he did not consider survival likely. Dr O recalls that the family considered that Mr A had been “quite ready to die pre-operatively ...”
51. Dr O stated to HDC that Mr A had become increasingly unwell overnight, and that he interpreted his condition as being “indicative that the limits of care had been reached, and that it was now appropriate to switch to a palliative mode of treatment”. After consultation with Mr A's family, Dr O told HDC that he “formalized a transition to a palliative mode of care for [Mr A] ...”
52. Dr O stated to HDC that he recalls making a decision not to look at Mr A's postoperative CXR when he reviewed the morning films. He stated:

“I did NOT review the chest X-ray before [Mr A] died. (I reviewed all chest X-rays after seeing the other patients, as was my custom, and deliberately did not review him as a palliative care plan was already in place.)

...

I actually pulled up his name, then closed it again without looking. My rationale was that we already had a concrete and fixed plan in place and there was no additional benefit. This was a mistake.”

53. Dr P told HDC that he was not present during Dr O's meeting with Mr A's family, but Dr O advised him of the decision to commence palliative care. Dr P stated that at approximately midday he reviewed his patients' radiology and microbiology as is his routine. He told HDC that he recalls making a conscious decision not to review Mr

²³ An infection of the peritoneum (the thin tissue that lines the inner wall of the abdomen and covers most of the abdominal organs).

A's radiology, as a decision had been made to commence palliative care, and there was no new radiology to review since he began his shift.

54. Dr H told HDC that between 8.00am and 9.00am, while he was on his way to the ICU to review Mr A, Dr O informed him that treatment for Mr A was being withdrawn. Dr H stated:

“[I]t is not my practice and never has been to check the chest x-rays which have been undertaken ... overnight to check the positions of their lines and in fact I was not aware that an x-ray had been taken.”

55. Dr H acknowledged, however, that it would have been routine to take a CXR after a central line had been placed, and he was aware that this had been done. He said that he had intended to review Mr A's radiology when he attended ICU that morning but, after speaking to Dr O, he decided that this was no longer appropriate.
56. After active treatment had been withdrawn, Mr A died at approximately 1.50pm on Day 5.

Review of postoperative CXR

57. On Day 6, Dr F arranged for Mr A's X-rays to be reviewed at a regular multidisciplinary radiology meeting. With regard to the postoperative CXR, a large tension pneumothorax was visible, which had not previously been detected by any member of staff. SDHB concluded that the tension pneumothorax contributed to and “possibly directly caused” Mr A's death.

Subsequent events

Apologies

58. Dr K told HDC that he acknowledges the part he played in the events leading to Mr A's death and “apologises unreservedly for it”. He said that he has learned a great deal about “fixation error” and the need to keep an open mind. He has developed an admission checklist to ensure that he has details about any interventions that have occurred prior to patients arriving in the ICU. Dr K stated that he now looks at all chest X-rays during his shift (regardless of any indication to do so) and follows up any intervention that he has been personally involved in.
59. Dr O told HDC that he is “sincerely sorry” for the part he played in the events leading to Mr A's death. He stated that he has changed his practice and now views all results available prior to a family meeting, and he reviews all X-rays, even on patients for whom active treatment has been withdrawn. He has personally been involved in considering and implementing the recommendations of the Sentinel Event Review instigated by SDHB (discussed below).

60. Dr P told HDC that he “deeply regret[s]” his decision not to review Mr A's radiology.

SDHB Sentinel Event Review

61. The DHB instigated a Sentinel Event Review (SAC1) as a result of the findings made at the regular multidisciplinary radiology meeting. The Review found the following:

Clinical assessments of Mr A

62. Surgeon and ICU consultant Dr Q wrote a report to SDHB for the purposes of the SAC1 review. With regard to the clinical assessments of Mr A's respiratory condition and subsequent finding of a pneumothorax, Dr Q considered it "most plausible" that "the noises from the large airways or the other lung were sufficiently loud to be transmitted across the space and give the impression of air entry into the right lung". Dr Q also acknowledged that "the index of the suspicion for pneumothorax was low", and that Mr A was

"a man for whom the preoperative probability of a poor outcome was high, and the known problems ... were more than adequate explanation for what was going on. In other words, [Mr A] was following a trajectory that was not unexpected."

Responsibility for checking the CXR

63. Dr Q stated in his report:

"It is standard policy in our unit that any intubated patient arriving in the ICU or any patient who has had a central venous line inserted has a Chest X-ray to check the position of the line or tube and to look for any complications of the procedure ... this is the first case that I am aware of where an X-ray has not been looked at and the patient's outcome has been severely compromised as a result."

64. Dr Q stated that "the practice is for the line not to be used for any infusion or drug administration until the position is checked [on the CXR]", and that this should prompt the nurse to advise the registrar that a CXR has been taken. Dr Q acknowledged that in this case the central venous line had already been in use in the operating room, so it could be presumed to be safe to continue to use it in the ICU, but that it is still necessary to confirm the position of the line.

65. Dr Q further stated:

"[W]hile the nurse's prompting may serve as a useful reminder, or hasten the doctor to review films, the nurse cannot be held accountable for the actions or omissions of the doctor(s)."

66. Dr Q said that the responsibility to check the CXR on the ICU rested on Dr K, as the ICU registrar on site, and that Dr K was supervised by Dr L on call and, ultimately, by Dr Q himself.

Outcomes of the SAC1 report

67. As a result of the SAC1 review, SDHB made of the following changes:

- Clinicians are now able to review results from home, although there is no obligation for them to do so.
- SDHB has implemented a paper-based flag system to show that an X-ray has been taken.

- A radiology review tick box system has been implemented for clinicians to sign off once they have viewed an X-ray.
- SDHB is in the process of implementing a system to automate reminders for reviewing films. (SDHB advised that this is specific to ICU only, and is nearing completion.)
- SDHB advised that it remains current practice that routine X-rays are taken for all appropriate ICU patients each morning, and reviewed after the ward round.

Responses to provisional opinion

68. In response to my provisional opinion, SDHB stated:

“We believe that it is a very unusual circumstance for so many clinical staff in this patient’s care to have missed the result, although we do not afford blame specifically to any one individual. We consider that there were systems in place but due to a number of circumstances in this specific case they [were] not followed and hence the error.

...

We note the role that communication played in the matters that are the subject of this complaint and we appreciate that this event has highlighted opportunities to improve our processes of handover in ICU and in the viewing of radiology. We have been working to improve these processes. We do not believe that our past systems were directly responsible for the failure of clear communication ...”

69. In response to my provisional opinion, RNs M and N acknowledged their failure to review Mr A’s postoperative CXR and subsequently to pick up the pneumothorax.

Relevant SDHB policies

70. SDHB’s policy “Nursing the ventilated patient”, dated October 2011, stated: “[C]heck the chest X-ray (CXR) for ET Tube placement, signs of pneumothorax, consolidation, collapse, nasogastric tube (NG) placement, and invasive line positioning.”
71. The updated policy, dated 2013, now also states: “An ICU Registrar/Consultant must also review the CXR.”
72. The 2012 ICU Registrar Handbook stated:

“[I]n the ICU you are clearly directly responsible to the consultant on duty, and you must communicate freely and promptly with that person ... It is very important that you discuss the plan for each patient with the nurse involved.

...

You are clinically responsible for all the patients in the unit ... Each patient must be fully assessed on admission including a comprehensive history and examination, careful checking of the placement, security and safety of all lines and tubes and a clear plan written for them.

...

You must also be responsible for ensuring that tests or consultations that are requested in the course of the ward round ... are actioned promptly and that the results are followed up in a timely manner.”

73. The ICU Registrar Handbook 2014 (updated December 2013) now includes the following:

“All intubated patients, those who have had [c]entral lines inserted or any patient with respiratory problems should have a CXR done on admission, unless it has been already done (eg in ED). If an Xray is done on a patient in the unit, the nurse or radiographer should put up the flag, (a notice saying ‘Xray taken’) on the patient’s monitor as a reminder that the films must be looked at within a few minutes. It is your responsibility to do this, and confirm that the flag can come down if there are no issues needing further intervention.”

Opinion: Southern District Health Board

Overview

74. Following Mr A’s admission to hospital, a number of failures led to him receiving suboptimal care and treatment. The individual health professionals who provided care to Mr A do hold a degree of responsibility for the failures that occurred. However, I am of the view that those failures were largely a result of service-level failures at the public hospital, for which SDHB holds responsibility. For the avoidance of doubt, I confirm that, with regard to the clinical assessments of Mr A, I have considered Dr Q’s statements referred to above. I have also considered the advice of my nursing expert, RN Dawn Carey, that “the observations carried out when [Mr A] arrived in the ICU were in accordance with expected standards”. I accept my expert’s advice in this regard.
75. My main concern is the failure by a number of clinical staff to review Mr A’s postoperative CXR until after his death. I am also concerned that a decision was made to place Mr A on palliative care without having reviewed all relevant information available, including the postoperative CXR.
76. A number of staff members had a responsibility to review Mr A’s postoperative CXR, and others had an opportunity to do so. In my opinion, the failure of any staff member to review the postoperative CXR was caused by a lack of clarity from SDHB regarding who was ultimately responsible for ordering and reviewing a postoperative CXR in these circumstances. There was also a failure by most clinical staff to

consider a differential diagnosis for Mr A. These issues were compounded by poor communication within the night ICU team, and between the night ICU team and the day ICU team on handover.

77. SDHB stated in response to my provisional opinion that systems were in place, but that due to “a number of circumstances” the CXR was not reviewed. In relation to communication, SDHB responded:

“We note the role that communication played in the matters that are the subject of this complaint and we appreciate that this event has highlighted opportunities to improve our processes of handover in ICU and in the viewing of radiology. We have been working to improve these processes. We do not believe that our past systems were directly responsible for the failure of clear communication ...”

78. As stated in previous opinions of this Office,²⁴ DHBs are responsible for the operation of clinical services within hospitals, and can be held responsible for any service-level failures. SDHB’s responsibilities include the need to ensure clear policies, good communication, and coordination between services. I remain of the view that the failures within the ICU, as discussed below, were service-level failures and are directly attributable to SDHB. Those failures compromised Mr A’s right to care of a reasonable standard and continuity of services.

Anaesthetic team: ordering and review of postoperative CXR — Other comment

79. Dr I placed the central venous line during surgery. Dr J stated to HDC that, as an anaesthetic consultant, he supervised and approved the actions taken by his registrar, Dr I.
80. My independent anaesthetic and intensive care medicine expert, Dr Ross Freebairn, advised that having placed the central venous line, best practice would have been for the anaesthetic team to order and then review a CXR in order to ensure correct placement of the line.
81. The anaesthetic team did not order a CXR, but did inform the ICU team that Mr A would require a CXR for confirmation that the central venous line had been placed correctly. Further, the ICU team accepted that it is usual practice to take a CXR for all patients arriving on the ICU after surgery.
82. Dr Freebairn advised that, while it was not best practice, in these circumstances it was acceptable to hand over to the ICU team the responsibility to review the placement of the central line.²⁵ I accept my expert’s advice and note that, while it would have been

²⁴ Opinion 10HDC00703 and 10HDC00419.

²⁵ The Australian and New Zealand College of Anaesthetists (ANZCA) Statement on the Handover Responsibilities of the Anaesthetist, provides at 4.2: “The anaesthetist must provide a formal handover to suitably trained and qualified staff in the recovery room (PACU) or ICU, with the appropriate briefing on relevant aspects of the surgery, and anaesthetic technique ... 4.3 The anaesthetist will provide specific advice regarding: Clinical observations and monitoring of reportable events ... [m]anagement of complications, particularly postoperative nausea and vomiting ... [r]espiratory therapy ... [d]ischarge expectations from PACU, [o]ngoing care related to anaesthesia matters ...”

preferable for the anaesthetic team to order and review the CXR, the anaesthetic team completed handover to the ICU team and informed the ICU team of the need for a postoperative CXR. Given that the postoperative CXR was then ordered and taken on the ICU after handover from the anaesthetic team, it could not reasonably be expected that the anaesthetic team would review the postoperative CXR.

Review of X-ray — Breach

83. On Mr A's arrival at the ICU, RN N completed a referral for a postoperative CXR to be taken on the ICU in order to check the line placement. Mr A continued to deteriorate, and Dr K maintained regular telephone contact throughout his shift with his consultant, Dr L, who was on call. Mr A's postoperative CXR was performed at 3.24am.
84. Mr A's postoperative CXR was not reviewed before his death by any member of staff involved in his care. I consider that the failure to review Mr A's postoperative CXR was due to the following factors (addressed in further detail below):
 - a. Lack of clarity from SDHB regarding the responsibility for reviewing postoperative radiology;
 - b. Failure by clinical staff to consider a differential diagnosis; and
 - c. Poor communication within the ICU team, including:
 - i. Poor communication within the ICU night shift team.
 - ii. Poor communication during ICU handover — night shift to day shift team.

SDHB policy

85. Dr Freebairn advised that there were a number of clinicians who could have reviewed Mr A's CXR. Dr Freebairn stated that "[i]t is unclear in the investigations why the Chest X-ray was not viewed by at least one" of the clinicians involved in Mr A's care. However, the SDHB policy is unhelpful in clarifying who should have had primary responsibility for viewing the CXR in these circumstances.
86. SDHB's policy "Nursing the ventilated patient", dated October 2011, stated: "[C]heck the chest X-ray (CXR) for ET Tube placement, signs of pneumothorax ... and invasive line positioning." The policy appears to have placed a large amount of responsibility on the ICU RN to check a CXR that is ordered on the ICU, and did not outline that the RN should inform the registrar that the CXR is ready for review.²⁶
87. However, as discussed further below, the SDHB policy also places responsibility on the registrar for checking line placement and "action[ing]" results of tests or consultations that are ordered "in the course of the ward round". The 2012 ICU Registrar Handbook stated further:

²⁶ As noted above, the updated policy, dated 2013, now also states: "An ICU Registrar/Consultant must also review the CXR."

“You are clinically responsible for all the patients in the unit ... Each patient must be fully assessed on admission including ... careful checking of the placement, security and safety of all lines and tubes and a clear plan written for them.”

88. This created a lack of clarity for clinical staff as to who had ultimate responsibility for reviewing a CXR in these circumstances.
89. Overall, I consider that the lack of clarity from SDHB regarding management and review of postoperative care compromised the care that Mr A received. The fact that no member of staff involved in Mr A’s care reviewed his postoperative CXR is unacceptable. Accordingly, SDHB failed to provide services to Mr A with reasonable care and skill and breached Right 4(1) of the Code.

Failure to consider a differential diagnosis

90. Prior to Mr A’s surgery, his clinicians formed the view that, given his co-morbidities, Mr A would likely deteriorate further after surgery and possibly not survive. After Dr L and Dr K spoke to Mr A’s family, Dr K recorded: “[W]e would support on ICU, if he shows signs of deterioration we would instigate some limits to his level of support earlier rather than later.”
91. I consider that the view held by the clinicians, that there was a high probability that Mr A might not survive surgery, was reasonably held. However, I am concerned that this view influenced the clinicians in failing to consider alternative reasons for Mr A’s deterioration, after his surgery.
92. Further, it is evident that the clinicians consistently attributed Mr A’s symptoms to him having aspirated prior to surgery. This diagnosis was not challenged, for the most part, by the clinicians responsible for Mr A’s care. I note my expert’s advice that:

“The history, signs and symptoms surrounding the deterioration preoperatively, intra-operatively and post-operatively were consistent with that of severe aspiration pneumonia, although other diagnosis could also produce the hypoxemia and shock that occurred.”

93. While I accept that Mr A’s postoperative symptoms were consistent with having aspirated prior to surgery, I also accept my expert’s advice that Mr A’s symptoms could have been caused by an alternative diagnosis. I am concerned that the clinicians responsible for his care, for the most part, failed to consider a differential diagnosis. This is evident in Dr L’s statement that when he was contacted by Dr K at 5.00am, he considered that Mr A’s postoperative condition was so consistent with his preoperative CXR that he did not specifically ask Dr K for the results of the postoperative CXR. Further, following these events, Dr Q stated in his report to SDHB:

“[T]he known problems ... were more than adequate explanation for what was going on. In other words, [Mr A] was following a trajectory that was not unexpected.”

94. I acknowledge that independent investigations were undertaken by both Dr K (the bedside echocardiogram) and by the RNs, regarding Mr A's condition. I accept RN M's statement that she and RN N considered the possibilities of a pneumothorax, aspiration pneumonia and pulmonary oedema. RN N advised HDC that she and RN M independently assessed Mr A having regard to these possible diagnoses. RN M told HDC that having suctioned Mr A's chest of dark brown sputum, along with the preoperative findings regarding aspiration, she and RN N concluded that Mr A was developing aspiration pneumonia.
95. While the ICU RNs turned their minds to the possibility of differential diagnoses for Mr A, consideration of an alternative diagnosis was not discussed with Dr K or recorded in the clinical notes. Consequently, Dr K did not have a complete picture of Mr A's condition, including the discussions held between the ICU nurses. Dr Freebairn advised:
- “The seriousness of the patient's condition from the time [he] arrived in Intensive care until [his] demise, warranted at least one full clinical bedside review by the Intensive Care Team. The absence of this occurring really increased the risk of the omission [to review the CXR] not being discovered, and subsequently increased the impact on therapy created by the omission.”
96. I agree with my expert's advice and consider that the ICU team should have undertaken a full bedside review of Mr A, including a discussion regarding possible causes of his deteriorating condition. This would have provided an opportunity for a discussion regarding investigations undertaken on Mr A, including his radiology.
97. The failure by clinicians to consider a differential diagnosis was compounded on the morning of Day 5, in the handover of care to the day ICU team. The day team was advised that Mr A had aspirated prior to surgery, and the issue of withdrawal of treatment was discussed. However, nobody questioned the existence of a postoperative CXR. Dr Freebairn stated:
- “Although required to ‘take into account the nature and probability of all potential outcomes’ the team has accepted presumptive diagnosis of aspiration Pneumonosis/Pneumonitis, with shock secondary to this, without ‘challenging’ or reviewing the diagnosis. A review of the clinical situation at this time (with review of the X-ray) would have revealed the pneumothorax.”
98. Dr O, Dr P and Dr H each told HDC that they made a decision not to review Mr A's radiology, as a plan for palliative care was in place. In my view, this is a case of individual clinicians accepting a presumptive diagnosis “without having regard to the bigger picture of the patient's presentation ... It is a case where clinicians should have continued to ask the pertinent questions while the patient was under their care.”²⁷

²⁷ See Opinion 10HDC00703 (11 September 2012) at www.hdc.org.nz.

99. Instead, what resulted was a number of missed opportunities to review Mr A's CXR. Accordingly, SDHB failed to provide services to Mr A with reasonable care and skill, in breach of Right 4(1) of the Code.

Poor communication within ICU team

100. The members of the ICU team on the night shift of Day 4 and Day 5 did not communicate adequately with each other regarding Mr A's care. In particular:
- a. ICU RN M and RN N failed to communicate to Dr K that a postoperative CXR had been taken on the ICU;
 - b. Dr K failed to communicate with the ICU RNs regarding whether a postoperative CXR had been ordered; and
 - c. Dr L failed to ask questions of Dr K regarding Mr A's postoperative CXR.
101. On Mr A's arrival at the ICU, RN N completed an X-ray referral form for an "urgent" CXR in order to check the line placement. The postoperative CXR was taken at 3.24am.
102. Dr K stated that "it would be standard practice for the bedside nurse to ask the doctor to check the [CXR] ...". Dr K told HDC that he was not asked to review the postoperative CXR at any stage. However, he acknowledged that it was standard practice for a CXR to have been taken in the ICU in these circumstances.
103. I note Dr Q's statement to SDHB that "the nurse cannot be held accountable for the actions or omissions of the doctor(s)". Dr Q placed the responsibility to review the CXR on Dr K, Dr L and, ultimately, on himself as head of ICU.
104. RN Carey provided advice that is consistent with Dr Q's statement, advising that "normal collegial behaviours would have meant that the [r]egistrar was notified [by the ICU RNs] that Mr A's [CXR] was available for viewing", but that this is not an obligation on the RNs. I accept my nursing expert's advice, as well as the opinion of Dr Q. I consider that the RNs cannot be held directly responsible for failing to review the CXR, nor were they given clear direction by SDHB to ensure that the registrar was aware that it was available to be reviewed.
105. However, both the RNs and Dr K had a responsibility to communicate adequately with each other regarding Mr A's care. The lack of communication between the ICU nurses and Dr K ultimately adversely affected Mr A's continuity of care, and represents service-level failures by SDHB.
106. I further note that twice in the early hours of Day 5, Dr K spoke to his consultant, Dr L, regarding Mr A's deteriorating condition. However, neither clinician discussed whether a postoperative CXR had been taken. Dr K reported the results of the bedside echocardiogram to Dr L and discussed Mr A's respiratory failure. Regarding Mr A's ventilation, Dr K advised Dr L that he would change the pressure control mode to APRV. Dr Freebairn advised that "when contemplating [APRV] as rescue therapy,

some attention should have been paid to the underlying cause — in this case assumed to be aspiration pneumonia ...”.

107. In these circumstances, Dr L and Dr K should have questioned whether a CXR had been taken, and whether the results of the CXR might have assisted in the treatment of a deteriorating patient. I accept that consultants should be able to rely on information provided by their junior staff, provided those staff have sufficient training and experience. However, both Dr L and Dr K had a responsibility to communicate adequately with each other regarding Mr A’s care, and failed to do so.
108. Both Dr Freebairn and Dr Q were of the opinion that, as ICU registrar, Dr K had primary responsibility for reviewing the postoperative CXR. However, Dr Freebairn advised:

“What is important, and not highlighted in the [SAC1] report is that not only was the review of the X-ray omitted by the registrar, but also by a series of other doctors who had responsibility for care for the patient. If any one of those doctors had reviewed the X-ray, asked what the X-ray findings were, or even if an X-ray had been viewed, the likely outcome would have been the detection of the pneumothorax, and remedial action taken. The pneumothorax is clear and obvious on the chest X-ray that was taken and not viewed.”

109. I agree that Dr K failed in his responsibility, but agree with my expert that, as well as Dr K, both the RNs and Dr L also had a responsibility to communicate with each other regarding Mr A’s care. I consider that ultimately the lack of communication within the ICU team adversely affected Mr A’s continuity of care.

Poor communication during ICU team handover — night shift to day shift

110. As the ICU team from the night shift had not reviewed Mr A’s postoperative CXR, the team was unable to provide the day shift team with complete information regarding Mr A’s condition. Dr K told HDC that he was not asked about the CXR by anyone present during handover. As stated by Dr Freebairn in his advice:

“It is unclear why information about the X-ray was not included in handover information either to the consultant in the early hours of the morning, or at the 8 a.m. round, and if not presented, why it was not requested.”

111. On the basis of the information given to him (as well as other factors discussed below), Dr O decided, in consultation with Mr A’s family, to commence palliative care for Mr A. Both Dr H and Dr P²⁸ confirmed that neither of them reviewed Mr A’s postoperative CXR because a decision to commence palliative care had been implemented.

²⁸ Dr O’s registrar, Dr P, was present at the ICU handover, but was not otherwise directly involved in Mr A’s care. Dr P told HDC that he was not present during Dr O’s meeting with Mr A’s family, but that Dr O advised him of the decision to commence palliative care.

112. As a result of poor communication between the ICU teams, the decision to commence palliative care for Mr A, although made in consultation with his family, was based on inaccurate information regarding Mr A's clinical situation. I consider that the poor communication within the ICU team on night shift, and during handover to the day shift, displayed a lack of co-operation among providers, which subsequently affected the quality and continuity of services provided to Mr A. Accordingly, SDHB breached Right 4(5) of the Code.

Summary

113. District health boards are responsible for ensuring the provision of safe and adequate healthcare to consumers under their care. While individual health professionals must take some responsibility for the failures that occurred, the failures were largely a result of service-level failures by SDHB.
114. SDHB failed to provide clear direction to staff about management and review of postoperative care. In doing so, SDHB failed to undertake a timely review of Mr A's postoperative CXR. Further, SDHB is responsible for failures within the ICU team to consider differential diagnoses for Mr A. SDHB did not provide services to Mr A with reasonable care and skill and, accordingly, breached Right 4(1) of the Code.
115. The responsibility for ensuring clear communication within and between medical teams also extends beyond individuals to SDHB. Ultimately, the failure to communicate adequately with each other regarding Mr A's condition affected the quality and continuity of service to Mr A. Accordingly, SDHB breached Right 4(5) of the Code.
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Adverse comment — Dr K

Review of CXR

116. Both my expert, Dr Freebairn, and Dr Q were of the opinion that, as ICU registrar, Dr K had primary responsibility for reviewing the postoperative CXR.
117. I acknowledge that Dr K was a registrar and was being overseen by Dr L. I note Dr K's statement to HDC that he acknowledges the part he played in the events leading to Mr A's death and "apologises unreservedly for it". I also note the changes that Dr K has made to his practice.
118. As stated above, I agree that Dr K failed in his responsibility, and this was clearly unsatisfactory. However, I also agree with Dr Freebairn that, as well as Dr K, other clinicians who had responsibility for Mr A's care also omitted to review the CXR. In addition, I accept that Dr K has learned from this error and has taken steps to modify his practice in this regard.
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Adverse comment — Dr O

Decision to commence palliative care

119. Dr O stated that he was told by Dr K at handover that discussions between Mr A and Dr L the previous evening had suggested that Mr A was aware of the severity of his condition, and was resigned to the fact that he might die. Dr O stated that his discussion with Dr K led him to believe that “limits of care ... had been imposed prior to [Mr A’s] operation”.
120. Dr O stated that overnight Mr A had become increasingly unwell, and Dr O interpreted his condition as being “indicative that the limits of care had been reached, and that it was now appropriate to switch to a palliative mode of treatment”. Dr O stated:
- “I did NOT review the chest X-ray before [Mr A] died. (I reviewed all chest X-rays after seeing the other patients, as was my custom, and deliberately did not review him as a palliative care plan was already in place.)”
121. Dr Freebairn stated:
- “[A]ny consideration of the withholding or withdrawing of treatment should take into account the nature and probability of all potential outcomes together with any known views of the patient concerning an acceptable quality of life and an acceptable burden of treatment ... a decision to withdraw therapy should have been made after the review of the findings, including the chest X-ray. This did not occur.”
122. I am of the view that clinicians should always ensure that they are aware of relevant information when making a decision regarding a consumer’s care and treatment. This is especially important when making the decision to implement palliative care (thereby withdrawing active treatment). I am concerned that Dr O failed to ensure that he was informed of all information relevant to the decision to implement palliative care to Mr A.
123. I note Dr O’s advice that he has made changes to his practice to ensure that he reviews all X-rays, even on patients for whom active treatment has been withdrawn. Dr O has also advised HDC that he has been personally involved in considering and implementing the recommendations of the SAC1 review. I also acknowledge Dr O’s statement to HDC that he is “sincerely sorry” for the part he played in the events leading to Mr A’s death.
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Recommendations

124. I recommend that SDHB apologise to Mr A's family for its breaches of the Code. The apology should be provided to HDC within **1 month** of the date of this opinion.
125. I also recommend that SDHB undertake the following:
- Provide evidence that the outcomes of the SAC1 review have been implemented, and report on any further changes that have occurred following the implementation of those recommendations.
 - Provide evidence of direction given to SDHB clinicians regarding the ability to review test results from home (as a result of the SAC1 review), including clear direction regarding who retains responsibility for reviewing those results.
 - Review its processes regarding:
 - a. handover of care between departments; and
 - b. responsibility for reviewing radiology.

SDHB is to report to HDC on the outcome of these reviews, within **3 months** from the date of this opinion.

Follow-up action

- A copy of this report with details identifying the parties removed, except the experts who advised on this case and Southern DHB, will be sent to DHB NZ and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Appendix A — Independent anaesthetic and intensive care advice

The following expert advice was obtained from anaesthetist and consultant intensive care medicine specialist Dr Ross Freebairn:

“From a clinical perspective was it reasonable to attribute [Mr A’s] postoperative condition to complications of aspiration pneumonia? Were adequate steps undertaken to exclude other remedial causes for his cardiorespiratory instability?”

From a clinical perspective was it reasonable to attribute [Mr A’s] postoperative condition to complications of aspiration pneumonia? The history, signs and symptoms surrounding the deterioration preoperatively, intra-operatively and postoperatively were consistent with that of a severe aspiration pneumonia, although other diagnosis could also produce the hypoxemia and shock that occurred. The preoperative events with vomiting suggested aspiration was likely. The preoperative Chest X-ray is reported as showing right middle lobe changes, consistent with aspiration pneumonia. Severe aspiration pneumonia can result in cardiovascular instability, which in part can be caused by acute pulmonary hypertension and right heart failure.

There were findings on the echocardiogram performed by the intensive care registrar at intensive care admission [that] suggest that some degree of right-sided failure/pulmonary hypertension were present. This could also be caused by a pneumothorax. Increasing hypoxemia despite increasing inspired oxygen suggests increasing shunt over time, consistent with the course of severe aspiration pneumonia.

Were adequate steps undertaken to exclude other remedial causes for his cardiorespiratory instability?

Hypotension occurring after the initiation of positive pressure ventilation is usually due to one of the following:(1, 2)

Hypovolaemia, exacerbated by reduced venous return due to positive intra-thoracic pressure.

Drugs used for induction of anaesthesia, for intubation, and for the maintenance of sedation/anaesthesia. Almost all anaesthetic agents, sedatives and analgesics cause vasodilatation and myocardial depression.

Gas trapping due to over-enthusiastic ventilation.

Although far less common, tension pneumothorax should always be considered.

The differential diagnosis for the acute respiratory and cardiovascular collapse should have included a pneumothorax, and other common causes of collapse.

Progressive hypoxemia, if adequate ventilation and inspired oxygen partial pressure is provided, is the result of increasing respiratory shunting, increased ventilation/perfusion mismatching and or diffusion abnormality.

The aspiration pneumonia could be a cause of the progressive hypoxemia.

Endo-bronchial intubation, collapse of a lung segment or lobe, collapse or consolidation should also be considered, for which a Chest X-ray would be a useful tool to aid diagnosis. While other investigations could have been contemplated, and some (including an echo-cardiograph) were undertaken, a chest X-ray, given postulated cause of the shock, and the severity of his condition would have been essential.

The steps taken to restore his blood pressure, and to improve oxygenation were consistent with good medical practice for the resuscitation of the critically [ill], with the single omission of not checking the chest X-ray for intra-thoracic causes of shock and hypoxemia.

The RN has noted at 05:30 on Day 5 that [Mr A] had reduced breath sounds in his right chest, but this does not appear to have been brought to the attention of the medical staff. Please comment on this observation.

Reduced breath sounds (noted as 'bilateral air entry but R sided markedly quieter than L') would be entirely consistent with a diagnosis of aspiration pneumonitis /or pneumonia.(3)

The presence of bilateral air entry did not suggest a pneumothorax was a more likely cause.

As the finding was not inconsistent with the earlier diagnosis of aspiration pneumonitis it would be reasonable for nursing staff not to report this finding to the medical staff.

Although the notes are timed at 05:30 the findings recorded by the nurse were more likely established over a longer time period, and is summation of the observations made since admission to the intensive care unit some two hours prior.

The failure by medical staff to review [Mr A's] post-operative chest X-ray appears to have had significant implications regarding the appropriateness of his treatment in ICU. Please comment on this omission, including to what degree this aspect of [Mr A's] management [did not meet] expected standard, and what you perceive to be the relevant contributory factors in this case.

The cardiovascular deterioration from the time [Mr A] became increasingly dependent upon oxygen to maintain saturations, in the operating theatre, while ascribed by the clinicians to either sepsis or severe aspiration pneumonitis, is quite possibly the result of tension pneumothorax. Prior to this point the presence of chest X-ray changes consistent with pneumonia or aspiration pneumonitis, suggests that aspiration pneumonitis could have explained the hypoxemia.

It appears that the insertion of the central line is the most likely precipitant of the pneumothorax, although insertion of the nasogastric tube, positive pressure ventilation and operative trauma are all possible causes.(4)

Care of a ventilated patient in intensive care usually includes a chest X-ray after admission to confirm endotracheal tube position (and also the nasogastric tube) and to exclude adverse effects of intubation and ventilation (including a pneumothorax).

Care of a patient following insertion of an upper body central venous catheter (CVC) (also known as central venous line) includes a Chest X-ray.

Had the X-ray been reviewed it is extremely likely that the pneumothorax would have been identified.

If identified, drainage would have been contemplated, and according to [Dr O's] letter to the coroner likely to have been undertaken.

The failure to diagnose the pneumothorax was a major contributor to his death.

There are a number of clinicians who could have reviewed the Chest X-ray that was taken:

The Anaesthetic registrar who placed the line.

The Anaesthetic Consultant who was supervising the case.

The Surgical registrar (who was in the operating theatre).

The Surgical Consultant (who performed the surgery).

The on call Intensive Care senior medical officer when the patient was admitted.

The on duty Intensive care registrar.

The Intensive care consultant on the morning of [Day 5].

The Intensive care registrar on [Day 5].

Having ordered the Chest X-ray (and this should be routine for the reasons described above), viewing of this should be a standard part of care. It is unclear in the investigations why the Chest X-ray was not viewed by at least one of the list above.

Those that had a responsibility to ensure the X-ray was reviewed in a timely fashion are:

The Anaesthetic registrar who placed the line, as he/she was primarily responsible for the placement of the line. There was an obligation to either view the line themselves, or to ensure that it was reviewed by a clinician able to read this.

The on duty Intensive care registrar, as part of the routine admission practice. It is likely that the ICU registrar, adding to the responsibility of reviewing the X-ray, ordered the X-ray.

The on-call Intensive Care senior medical officer at the time that the patient was admitted. While the consultant was not present in the hospital, the Registrar had sought advice from his senior colleague about the plan. It is not clear what this conversation entailed, but the outcome was a change made to APRV (Airway pressure release ventilation). APRV is a mode of ventilation used for severe hypoxemic respiratory failure, and when contemplating it as rescue therapy, some attention should have been paid to the underlying cause — in this case assumed to be aspiration pneumonia, but almost certainly a large contribution came from the collapsed lung.

The Intensive care consultant on the morning of [Day 5]. At some point the decision was made to move from active treatment aimed at prolonging [Mr A's] life, to a palliative approach aimed at ensuring his pain, distress and suffering were controlled. While intensive care treatment may be life-saving for patients with reversible critical illness, medical intervention can cause considerable suffering for patients and their families with little or no benefit.

The withholding or withdrawing of specific treatments is appropriate in some circumstances. However any consideration of the withholding or withdrawing of treatment should take into account the nature and probability of all potential outcomes together with any known views of the patient concerning an acceptable quality of life and an acceptable burden of treatment. Any decision to withdraw or limit treatment first requires the consensus of the intensive care team and the primary medical or surgical team. The decision was made either by the overnight team, or by the new team starting on [Day 5] at 8 am, or quite possibly as a consensus decision of the teams.

Although required to 'take into account the nature and probability of all potential outcomes' the team has accepted presumptive diagnosis of aspiration Pneumonia/Pneumonitis, with shock secondary to this, without 'challenging' or reviewing the diagnosis. A review of the clinical situation at this time (with a review of the X-ray) would have revealed the pneumothorax. A process of reviewing the diagnosis, co-morbidities, along with the past and current therapies in order to consider the potential outcomes seems to have been curtailed. While the admission review of the patient by the intensive care registrar missed reviewing the X-Ray, a subsequent review at the time of consideration of the withdrawal of treatment would have revealed the initial oversight. When the limitation review was undertaken seems to be unclear. The Intensive care consultant of the Day 5 states that he did not review the X-ray, by choice, as the decision had been moved to a palliative approach. However, a decision to withdraw therapy should have been made after the review of the findings, including the chest X-ray. This did not occur. It is not clear what the process of handover was, and who was involved in the decision to withdraw. If the diagnosis had been made at 8am or shortly thereafter it is not clear that [Mr A's] condition was reversible. He had been exposed to significant hypoxemia and was on large doses of vasoactive agents to

maintain his blood pressure. However the X-ray should have been viewed to confirm the diagnosis, and to exclude reversible causes of the shock.

Please comment on the relevant aspects of the sentinel report, including the adequacy and appropriateness of the remedial measures described and any issues you feel have not been addressed.

The department undertook a review immediately it was realized that there was the finding of a previously [undiagnosed] pneumothorax. They took immediate steps to inform the family, with open disclosure of the omission of reading the Chest X-ray, made by the team. The Intensive care registrar rostered on overnight admitted the omission and acknowledged responsibility for this. Subsequently a sentinel event review was performed that tried to identify the causes of the event, and made recommendations to address these issues.

However there has been comment made that there had [been] previous events when radiology (and possibly other investigations) [had been] found in the morning to differ from the interpretation overnight. While different interpretations are not uncommon, it is impossible to ascertain whether these interpretations are of significant relevance.

What is important, and not highlighted in the report is that not only was review of the X-ray omitted by the registrar, but also by a series of other doctors who had responsibility for care for the patient. If any one of those doctors had reviewed the X-ray, asked what the X-ray findings were, or even if an X-ray had been viewed, the likely outcome would have been the detection of the pneumothorax, and remedial action taken. The pneumothorax is clear and obvious on the chest X-ray that was taken and not viewed.

The recommendations:

Recommendation 1: It is not clear what is meant by 'supported'. Does this mean the cost is borne by the individual and subsidised by the employer, or that the DHB will provide this access? Access to view CXR at home MAY have changed the course of this case, although the on-call consultant did not ask (or it is not recorded that he asked) if the Chest X-ray had been reviewed.

Recommendation 2: The reminder is unlikely to have any lasting effect, and the next rotation of registrars are just as likely to make the same error of omission.

Recommendation 3&4: Both excellent ideas, but need to become operational.

Recommendation 5: The team handover must be in an area, not simultaneously used for other purposes, with adequate IT and other support. In this case consultant handover was by telephone, and the consultant of the night before had not seen the patient postoperatively.

Recommendation 6–9: All need to be made operational.

All the recommendations, if implemented will have the effect of increasing awareness of radiological results. However the recommendations need to be implemented as a matter of urgency.

Other comments. There is a high standard of documentation of the discussion with the family surrounding withdrawal. This was clearly done in consultation with the family, although the underlying premise for the withdrawal was subsequently shown to be in error.

In summary:

There was a breach in regards to the standard of care provided by the medical staff of the Intensive Care Unit. While the primary responsibility for reviewing the X-ray was with the overnight ICU registrar, others including the anaesthetic registrar, the anaesthetic consultant, the Intensive Care consultant overnight, and the day time intensive care consultant also, for a variety of reasons [had a] responsibility to ensure the X-ray was reviewed. There was opportunity to do so and the deteriorating condition should have prompted a consultant review.

I am of the firm belief that the pneumothorax contributed to the patient's death. However, the patient's age and the underlying illness means that survival from the illness was not assured even if the pneumothorax had not occurred.

The Intensive care registrar has acknowledged his error. The organization has apologised to the family.

The Intensive Care Unit does not appear to have a robust process for either bedside consultant handover or for ensuring the X-rays are viewed in a timely fashion. It is unclear why information about the X-ray was not included in handover information either to the consultant in the early hours of the morning, or at the 8 a.m. round, and if not presented, why it was not requested. The absence of the previous day's on call consultant increased the risk of information loss. Ensuring the presence of the outgoing consultant at handover rounds, as well as the incoming consultant, would be a significant improvement. It is also not clear why the X-ray was not reviewed on the 8am ward round or shortly after. These deficiencies need to be addressed urgently to ensure further incidents such as this do not occur as the result of a single omission of care.

References

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2. McLean B, Zimmerman JL. Fundamental Critical Care Support 4th ed. Mt Prospect IL, USA Society of Critical Care Medicine; 2007.
3. Swash M. Hutchinson's Clinical methods 19th ed. London: Bailliere Tindall; 1989. 618 p.
4. Smith NL, Park M, Freebairn R. Case report and review — Nasogastric tube complications. Crit Care & Shock 2012 15:36–42.”

The following further expert advice was also obtained from Dr Freebairn:

“The failure to review the chest X-ray might not be considered a major error if you ignored the consequences. However, it was the failure to review the X-ray over a period of time, in the clinical setting of a deteriorating patient that made the departure more serious. A number of people had some sort of responsibility for ensuring the X-ray was reviewed, so there is the added concern that this omission was not picked up. The continued omission indicates that the system in place is not robust enough with regard to patient handover.”

Dr Freebairn was asked whether he agreed with the following statement:

“Although the failure to review the X-ray was a departure of a more minor nature (disregarding the consequences of the omission), the fact that there was the opportunity to review the X-rays, and a number of people who could have picked up on the omission made it a moderate departure.”

Dr Freebairn responded:

“The seriousness of the patient’s condition from the time [he] arrived in Intensive care until [his] demise warranted at least one full clinical bedside review by the Intensive Care team. The absence of this occurring really increased the risk of the omission not being discovered, and subsequently increased the impact on therapy created by the omission.”

Dr Freebairn added:

“In a perfect world both the anaesthetic registrar and the ICU team would have taken and viewed a CXR. However, it is ok for an anaesthetic registrar to hand over that responsibility to the ICU. It is not best/perfect practice but is ok. In my opinion this indicates a systematic failing. Both the anaesthetist and the ICU would blame each other and say that each other had the responsibility to order/review a CXR and both would be correct. However, they both failed to do so.”

Appendix B — Independent nursing advice

The following expert advice was obtained from HDC’s in-house nursing advisor, registered nurse Dawn Carey:

- “1. Thank you for the request that I provide clinical advice in relation to the complaint from [Ms B] about the care provided to her late father-in-law, [Mr A] whilst he was an in-patient at the public hospital, Southern District Health Board. In preparing the advice on this case to the best of my knowledge I have no personal or professional conflict of interest. However, I wish to share that I do know one of the registered nurses involved in this case — [RN N] — [in a professional capacity]. To the best of my knowledge I last met or communicated with [RN N] [several years ago].
2. I have reviewed the submitted documentation: complaint from Ms B; response and supportive documentation from SDHB including [Mr A’s] clinical notes and Sentinel Investigation findings.
3. I have been asked to provide clinical advice on:
 - (i) The observations of [Mr A] by ICU nursing staff on his arrival to the ICU
 - (ii) The responsibility of the ICU nurses regarding [Mr A’s] post operative chest x-ray
 - (iii) The ‘Nursing the ventilated patient in ICU’ policy version 2011.
4. **Review of clinical records, sentinel report, staff member statements**
I note the following:
 - (i) [Mr A] presented to the [public hospital] on [Day 1] with a history of abdominal pain, vomiting, and altered bowel habits.
 - (ii) Based on CT imaging a diagnosis of a gallstone ileus was made and a naso-gastric tube (NGT) was inserted on [Day 4]. During insertion, [Mr A] had a small vomit (approximately 60 mls). Upon insertion the NGT drained 2litres of brown liquid.
 - (iii) Over the next 5 hours [Mr A’s] general condition was noted to deteriorate — temperature 38.5°C, respirations 32, SpO₂ 90% on air, increasing shortness of breath and work of breathing. The deterioration was presumed to be secondary to aspiration; based on chest X-ray, chest auscultation, clinical presentation.
 - (iv) A plan was made for an urgent laparotomy to occur. [Mr A] transferred to the operating room in the early hours on [Day 5].
5. **Observations upon arrival [in ICU].**
 - (i) Upon completion of the laparotomy and removal of gallstone from his jejunum, [Mr A] was admitted to the ICU at approximately 2.30am on [Day 5]. The intraoperative issues — rapid atrial fibrillation, Esmolol, hypotension, desaturation, pink and frothy secretions, Frusemide, coarse bilateral breath sounds — and treatments/requirements were

handed over to the ICU team, which included two registered nurses. Also handed over was the presence of a right internal jugular central venous line. It is reported that insertion occurred after induction and intubation, was under ultrasound guidance, achieved on first pass and without problems.

- (ii) The ICU daily chart (DC) records two ticks under 'R/L air entry' as part of admission observations.
- (iii) A bed space Echocardiogram was performed at 3.15am. The findings were not consistent with severely impaired cardiac function. Documentation reports ... *significant respiratory failure secondary to aspiration of small bowel contents earlier today* ...
- (iv) [Mr A] had a portable chest X-ray at 3.24am.
- (v) Other relevant recordings on the DC over the course of the night include stable tidal volumes, reducing airway pressures, the presence of purulent secretions, and stable/reducing CVP values.
- (vi) The nursing assessment (NA), which is required to be completed within six hours of admission reports bilateral air entry with the right side being ... *markedly quieter than L. Anaesthetist felt pulmonary oedema in MOT but on suctioning purulent sputum aspirated* ...

Comments

In my experience as an ICU RN, an iatrogenic/spontaneous pneumothorax that tensions presents emergently and is usually diagnosed by auscultation, inspection of the chest and marked cardiovascular and respiratory instability. Depending on the mode of mechanical ventilation other signs include: airway pressures increasing markedly, detection of auto PEEP, and reducing compliance with a loss of tidal volumes. Both the RNs and the duty registrar report auscultating [Mr A's] chest when he arrived in the ICU. All report noting bilateral air entry. This is also recorded on the DC. Statements from the RNs explain that [Mr A's] breath sounds were not as audible on the right side but that this finding can also be explained by him aspirating. I agree.

As a RN peer, I am of the opinion that the observations carried out when [Mr A] arrived in the ICU were in accordance with the expected standards.

6. The responsibility of the ICU nurses regarding [Mr A's] post operative chest x-ray

In my experience it is very common for an ICU RN to request a patient chest X-ray. Reasons for this are collegial rather than representing an extension of nursing autonomy. In my opinion, [the ICU] RNs were responsible for facilitating [Mr A's] chest X-ray happening in a timely and safe manner but not responsible for interpreting the findings. I acknowledge that normal collegial behaviours would have meant that the Registrar was notified that [Mr A's] chest X-ray was available for viewing. Please note that under Nursing Council of New Zealand standards and competencies, responsibility and accountability are very prescriptive terms.

**7. The ‘Nursing the ventilated patient in ICU’ policy version 2011.
Clinical advice**

This is a guideline document that RNs employed [in ICU] are to follow when nursing mechanically ventilated patients. Page 2 states ... *respiratory assessment must include the following ... check the chest X-ray for ... signs of pneumothorax ...*

I have interpreted this as a local employment standard rather than being representative of the practice of all RNs employed in a New Zealand ICU.

I am aware that until very recently [the ICU] managed their own ICU specialised nursing course ‘in-house’ rather than through an external advisor. This may be why their guidelines set such a high bench mark of ‘must include’ rather than using more qualified terms. In my opinion, chest X-ray interpretation is a skill that is desirable for a RN working in an ICU to be competent with. In contrast, I would consider attaining and maintaining resuscitation skills to the New Zealand Core 7 to be an expected level of ICU nursing practice.

Dawn Carey (RN PG Dip)
Nursing Advisor”