QUEENSLAND COURTS

OFFICE OF THE STATE CORONER

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of an infant**
TITLE OF COURT:	Coroner's Court
JURISDICTION:	Brisbane
FILE NO(s):	2007/41
DELIVERED ON:	6 December 2012
DELIVERED AT:	Brisbane
HEARING DATE(s):	7 December 2011, 2 – 5 April 2012
FINDINGS OF:	Christine Clements, Deputy State Coroner
CATCHWORDS:	CORONERS: Inquest – Death of an infant, suspicious circumstances, evidence of inflicted injury.

REPRESENTATION:

Counsel Assisting:	Ms Emily Cooper
For the Mother:	Katarina Prskalo i/b Legal Aid, Queensland
For the Father:	Chris O'Meara i/b Hodgson Lawyers as funded by Legal Aid Queensland

Introduction

An infant died at the Mater Children's Hospital, South Brisbane in Queensland in 2007. He was seven weeks of age at the time of his death. His death appeared to be due to traumatic injury and was reported to the coroner. The inquest focused on seeking to establish how and what caused the infant to die.

Background

The child's parents were both 20 years of age when the infant was born. The mother had a two year old child from a previous relationship.

The infant was born prematurely at 37 weeks after an uncomplicated vaginal delivery. The infant faced the expected difficulties of a child born prior to the expected date and spent two weeks in the neonatal unit due to underdeveloped lungs. The infant was discharged home into the care of his parents. Various family members were involved in assisting the young couple with the baby over the next eight day period and there were no concerns.

In the early weeks of the infant's life his parents were concerned about the infant's breathing. The lips appeared to be blue and the eyes were rolling back. They took the infant to the Emergency Department of the Royal Children's Hospital where he was admitted for observation. The infant was cared for by a paediatrician, Dr Nigel Dore. Dr Dore's evidence confirmed the infant was feeding poorly, had a history of jaundice attributable to the premature birth and had experienced a possible episode of apnoea. Dr Dore considered the infant was suffering from a respiratory illness.

Importantly, Dr Dore did not notice any symptoms or make any observations to suggest non-accidental injury. There were no signs of bruising, burns or tenderness on palpation. A full blood count showed signs of a viral infection with a low lymphocyte count.

A chest x-ray was performed which showed mild hyperinflation and a peribronchial thickening consistent with bronchiolitis. This is a very common condition in infants of this age group. No rib fractures were observed at the time. There were no documented seizures suffered by the infant during this admission. The infant was treated with oxygen and nasogastric tube feeding over the next 24 hour period. His condition improved and he was then discharged into his parents' care.

Dr Dore confirmed there was nothing to suggest the infant had sustained injury prior to this admission. He expressed the opinion as at the 25 July he would not have expected the subsequently discovered subdural haemorrhage or rib fracture to be present.

The infant's parents cared for the child over the next month. There was nothing by way of health difficulty or incident during this period which could account for the subsequent sudden demise.

The only possible explanation raised by either parent with respect to the rib injury was the mother's evidence at the inquest. She said her older child had fallen on the infant. She said we, (presumably herself and the father) were in the kitchen and the infant was down on the ground in the lounge room, under a little play gym apparatus. She said the older child was walking around the infant when he caught the corner of the gym toy and tripped and fell down onto the infant. The baby was lying on his back as far as she could recall. She said she saw it just after it had happened. She said there was no response from the infant by way of a cry. She looked the baby over. She thought the two children had come into contact in the middle. She said her older child was not carrying anything and was aged 25 months at the time. He was perhaps 15 kilos in weight.

I accept subsequent comment by the reviewing medical experts that this incident is highly unlikely to have caused the rib injury detected at post-mortem.

No other explanation has been raised.

I note the infant was generally described as a quiet baby who slept a lot, which is not unexpected for a child of that age.

Child care

The infant commenced long day care at a Child Care Centre when aged 35 days old. The older sibling had attended long day care since he was approximately eight months of age. He was enrolled for long day care at the same centre at the same time as the infant. The plan was to enable the mother to seek employment as the father was unemployed at the time and also seeking work.

The infant attended the day care centre for three days running in 2007. Neither parent had any concerns with respect to the infant's care at the centre.

Evidence was provided by the director of the child care centre and a child care worker.

The group leader said she met the mother when the children were enrolled. The only medical condition referred to was the fact of the infant's premature birth.

On the day the infant became critically unwell the infant was dropped off at child care by both parents at about 10:00am. The infant was asleep and was taken to the nursery and placed on a large cushion.

The infant slept most of the day, which was considered normal behaviour for a baby of this age and there was no reason for concern.

At about 11:00am, another toddler who had recently commenced to walk stumbled. She was carrying a plastic pot. The group leader heard the toy

hitting the floor when the child stumbled and she ended up on her bottom. The group leader was feeding another child and she looked up. She saw the toy was on the cushion beside the infant next to his head. The infant had started to cry.

The infant was picked up and stopped crying. They checked the infant over but could not see any marks or any sign of injury. The infant appeared to be well and continued at day care until about 4:20pm when picked up by the parents.

The infant was fed during the afternoon and then placed back on the cushion where the infant went back to sleep. The evidence from child care workers was there was nothing untoward or unusual in the behaviour that day. The parents were not informed about the incident concerning the plastic pot.

The child care worker's evidence was she thought the infant was still asleep when picked up from child care by the parents. The mother confirmed her recollection was the infant was asleep when picked up from child care and placed in the car. The father was with the mother when the children were picked up. There was no information from the child care centre to indicate there had been any difficulty or any concern with respect to either child that day.

The mother recalled the infant was still asleep when they arrived home and she placed the child in a rocker in her bedroom. She was planning to go out to the gym for a personal training session and therefore tried to ensure the infant remained asleep. She did not notice anything concerning about the infant when placed in the rocker nor was there any sign of injury.

There was some inconsistency between accounts provided by the mother at different times with respect to whether or not the infant was awake or asleep when she placed him in the rocker. An earlier account provided to police in 2007 indicated the infant was looking around and was quite happy and smiling.

The father was preparing food for the older child, who was in his highchair, when the mother left for an hour long training session. It was the first time the father had exclusive care of the infant for more than about half an hour since the birth. The mother left for the gym at about 5:00pm.

The father provided evidence to the inquest, but only after being directed to do so pursuant to s. 39 of the *Coroners Act 2003*.

He went to check on the infant about 15 minutes after the mother left the house. The infant was strapped in the rocker. When the father entered the room he said the infant was gasping for air and the lips were blue.

He took the baby out of the rocker and placed the child on the floor while he grabbed the cordless phone. He called the mother first and then the ambulance. Records indicate the call to the mother was at 5.17 pm and the

call to the ambulance was 5.21 pm. He immediately commenced efforts to resuscitate the infant once instructed by the ambulance operator. Ambulance paramedics arrived at 5:37pm. By the time ambulance officers arrived, the infant's mother was present as well as her mother, and the father's mother. The mother had called both grandmothers as soon as the father informed her there was a problem.

The father said when he discovered the infant was having a problem breathing he took the infant out of the rocker. At the inquest he said he cradled the child who was still making some movement. The father said he was panic-stricken and very upset. He said he tried to wake the baby up by rubbing him on his belly from side to side and moving from left to right. This was unsuccessful in making the child more awake.

The father's evidence was he was moving himself from left to right, just trying to get the infant to awaken.

He said he placed the infant down in the hallway on the floor and ran to the lounge room for the phone. He came back and picked the infant up and rang the mother. He felt she would know what to do. He asked her to come home as fast as she could, and told her the infant was not breathing. He made his way down to the lounge room with the infant as he called triple zero. He was told to check the child's airways, and he did so. He said there was some milk in the mouth but no food or anything else. The evidence suggests the last time the infant was fed was at the child care centre.

The father said he performed chest compressions using three fingers and gave puffs of breath to the infant through the mouth while he waited for the ambulance to arrive.

Ambulance officers attended and attempted to resuscitate the infant, but with little success. The baby was transported to the Mater Children's Hospital. I have little regard to evidence about the parents' observed demeanour or reactions from the time ambulance officers attended. People respond individually to circumstances of stress and grief, and it does not assist in reaching factual findings about events or the cause of death.

What is clear is that once the child was at hospital, medical examination established the infant was suffering from extensive subdural haemorrhage, multiple retinal haemorrhages and required to be intubated and ventilated. The neurological indicators were poor and it was unlikely the infant would survive. No surgery could reverse the pathology that had been identified. The assessment at the hospital also demonstrated the likelihood of a second subdural collection of a different age, suggesting an insult to the brain at some previous time.

From all of this information it was considered that the infant had suffered physical injury leading to the collapse. The treating medical team considered the most likely explanation for the infant's medical presentation was shaking. The only other explanation would be an 'axonal' injury as would be seen in a

high speed motor vehicle accident where the head is shaken backwards and forwards with violent force. There was no such background incident.

The infant was cared for and discussions were held with the parents informing them there was no chance of recovery. The infant died two days after admission to hospital.

Autopsy

A comprehensive autopsy was conducted by forensic pathologist Dr Nathan Milne. There was some apparent bruising on the vertex of the scalp. There were also three separate areas of bruising on the right upper limb.

The most significant injury was discovered upon internal examination. There was haemorrhage both between the skull and the brain (subdural haemorrhage) and within the brain itself (intracerebral haemorrhage). There was associated secondary change of brain swelling related to widespread nerve cell injury (diffuse axonal injury).

The pathologist noted there had been MRI imaging performed while the infant was alive on the 24 August 2007. This showed areas of subdural haemorrhage including areas which appeared to be of variable age from very recent to at least a month old.

The pathologist noted the cause of this injury was consistent with trauma.

There was also confirmation of retinal haemorrhage.

Dr Milne was informed of the incident at the day care centre where a child fell close to the infant whilst carrying a plastic pot. The pathologist dismissed this as a possible mechanism of injury observed at autopsy.

Autopsy also revealed a healing rib fracture considered between two and six weeks old. One bruise on the right forearm appeared to be no more than about three days old. Bruising on the scalp showed features of recent as well as older injury. The pathologist considered this was consistent with the time the infant was brought to hospital prior to death.

Neuropathology confirmed subdural haemorrhage which appeared to be at least 10-14 days old.

As well there was subarachnoid haemorrhage on the surface of the brain. There was ischaemic necrosis which appeared to be 24-48 hours old and likely to be consistent with the result of cardiorespiratory arrest.

Secondary swelling of the brain (cerebral oedema) caused by subdural haemorrhage and ischaemic necrosis was also observed.

The pathologist also noted injury to the nerve fibres (axonal injury) in the brain stem. This appeared to be at least three days old and therefore occurred before the cardiac arrest.

With respect to this finding the pathologist noted shaking was a possible mechanism of the injury.

The pathologist considered the infant died due to head injuries including subdural haemorrhage, ischaemic necrosis of the brain, cerebral oedema and axonal injury.

Given the information provided there was nothing to explain how the infant had sustained these traumatic injuries. Therefore the conclusion of non-accidental injury was the most likely cause. In the pathologist's opinion the findings were typical of non-accidental head injury; namely subdural haemorrhage, subarachnoid haemorrhage, retinal haemorrhage and axonal injury. Although these findings can be caused by accidental injuries, there was no account which could explain the findings in the infant.

With respect to the retinal haemorrhage, the severity and distribution around the retina was typical of non-accidental injury. Although it can occur in the context of raised intracranial pressure, the pathologist did not consider it was consistent with this possibility due to the degree of haemorrhage.

The pathologist considered there was a possibility of a combination of impact and shaking injury causing the infant's injuries.

He also referred to the rib fracture being at least two weeks old, again suggesting non-accidental injury in the absence of a plausible explanation.

It was also noted the subdural haemorrhage was initially suspected to be one month old. Microscopic examination showed it to be at least 10-14 days old. The pathologist concluded the first episode of subdural haemorrhage probably occurred around one month prior to death. The rib fracture appeared to be two to six weeks old and therefore could have occurred around the same time as the initial subdural haemorrhage.

The pathologist considered further subdural haemorrhage caused the deterioration. This might have resulted from a spontaneous re-bleed from the initial injury or it could have been due to another episode of trauma or repeated episodes of trauma.

What was patently clear was that no pre-existing natural disease could account for what was observed at autopsy or indeed, after the infant's final admission to hospital.

I accept the findings of head injuries as the medical cause of death for the infant.

How the infant came by these injuries remains problematic. This is especially so given the evidence that the infant may have suffered more than one head injury at different times and the rib injury detected at autopsy could have occurred at a different time.

I consider there is no evidence provided by either parent or any other witness who appeared at the inquest including relatives and child care workers that can explain the head injuries or the rib injury.

Expert medical review

Treating Doctors

Because it is probable that the infant's injuries were sustained at different times, and because there is no account provided to explain the injuries, the inquest considered detailed expert medical opinion.

Three doctors were involved in the infant's treatment during the final admission to hospital. Dr Liam Tjia is a consultant paediatrician. He examined the infant the morning after his admission to the Mater Children's Hospital. The information provided indicated the infant had been discovered with blue lips and not breathing. The infant had been well prior to this discovery.

Dr Tjia noted the infant had fixed pupils and was unresponsive with poor neurological status. There were signs of raised intracranial pressure and the doctor observed some bruising which appeared to be inconsistent with the normal handling of a baby. Otherwise there were no other signs of external injury detected at the time.

CT and MRI imaging revealed subdural haemorrhage and cerebral oedema. Dr Tjia observed there was differentiation indicating some blood was of an older age, indicating an older subdural haemorrhage. Dr Tjia relied on the expert ophthalmologist Dr Forrest's findings with respect to the infant's eyes, which revealed retinal haemorrhaging. In Dr Tjia's opinion and experience the degree of retinal haemorrhaging could only be consistent with trauma of a high force such as a motor vehicle accident or other inflicted injury.

Initial chest x-rays did not demonstrate any fractures. Dr Tjia noted autopsy imaging did reveal an older lateral rib fracture which was typical of an injury of inflicted trauma, in his experience. Dr Tjia expressed the view that such an injury could be produced by a squeezing force around the circumference of an infant's chest. No bruising around the ribs was observed at the time of the infant's admission.

Dr Tjia noted the two separate areas of subdural haemorrhage of different ages. Given the separate locations he was less inclined to reach a conclusion that this was a re-bleed from a pre-existing subdural haemorrhage. Rather, he suggested it was more consistent with a separate injury. He also considered it was very highly unlikely that the retinal haemorrhage was as a result of a re-bleed of the older subdural haemorrhage.

Dr Tjia considered the infant's presentation on the 23 August 2007 was due to an injury likely to have occurred on that day rather than some earlier incident.

He considered deterioration following injury would be instant or up to a period of a few minutes.

The damage that had been caused to the infant would require a very high velocity force such as in a motor vehicle accident if it was to be explained by non-accidental force. He expressed the opinion the classic example was of shaking, with or without impact. The shearing forces on the layers of the brain result in shearing strains to tissue layers. The impact can be as a result of blunt force trauma but does not necessarily require a hard surface. He noted there was some sign of bruising on the infant's head at autopsy.

Dr Tjia considered it most likely that the infant had suffered two separate injuries with the most recent occurring on the day of his admission to hospital.

Dr Martin Wood is a neurosurgeon at the Mater Children's Hospital. He examined the infant on the day of admission. He considered the account provided did not match with the injuries evident on the child.

When he examined the infant the child was intubated and ventilated with very poor neurological signs. The Glasgow Coma Score was very low at three and there was no response at all. The infant was unable to breathe spontaneously. Dr Wood confirmed there was no surgery which could reverse the pathology that was evident in the child who was in an unsalvageable condition.

Dr Wood also concurred with the opinion there were two subdural collections (bleeding) of different ages indicating insult to the brain at separate times. Although it is theoretically possible a child can sustain a subdural haemorrhage as an injury which occurs in the process of birth, he considered it unlikely in this infant's case. There had been an uncomplicated vaginal delivery and there was otherwise no account to suggest how the infant might have sustained the injury.

Dr Wood also considered it unlikely that there had been a re-bleed from the original subdural haemorrhage. He did not consider a re-bleed of a chronic subdural haemorrhage would cause a new acute injury as was evident on admission. He agreed there was evidence of two separate areas of the brain affected at different times.

Dr Wood also agreed with a proposition that axonal damage would cause very rapid deterioration and loss of consciousness in a matter of minutes and certainly no more than hours.

He agreed that such an injury would require the forces associated with a high speed motor vehicle accident, or violent shaking.

Dr Michael Forrest is a specialist ophthalmologist. He examined the infant on the day after admission and observed extensive haemorrhage in all retinal layers of the right eye. This extended from the very back of the eye through

to the very front of the eye. There were also extensive retinal haemorrhages in all retinal layers of the left eye.

Dr Forrest expressed the opinion this was consistent with major trauma and especially indicative of severe repetitive shaking.

Of particular significance, Dr Forrest rejected the suggestion the retinal haemorrhaging could be explained as resulting from raised intracranial pressure. I accept his expert evidence. There is simply no possibility of an accidental occurrence resulting in such an injury, or that it was a naturally arising condition, or incidental to birth.

Additional forensic pathologist review

The additional medical evidence brought before the inquest was from a second forensic pathologist, Dr Linda Iles. She reviewed the information including all of the material arising from the first autopsy. In particular, Dr Iles notes the combination of subdural haemorrhages, retinal haemorrhages and encephalopathy or brain swelling. This triad of conditions arises most commonly in the context of non-accidental injury unless there is some clearly overwhelming traumatic injury to explain the symptomology.

Dr Iles' examination of material and imaging led to her opinion of further rib injuries. She identified a further four rib fractures, or posterior fractures occurring in the right 4^{th}, 5^{th}, 6^{th} and 7^{th} ribs. She said there was no possibility to explain what she observed other than healing fractures, which she noted were difficult to visualise. The likely mechanism for these to occur is a squeezing mechanism of the chest.

Otherwise, Dr Iles' evidence was in general agreement with the findings of Dr Milne from the original autopsy.

As with other expert medical testimony, Dr Iles agreed the most likely explanation for axonal injury was trauma. Such an injury would require force greater than is likely to occur in the course of normal handling of a child. Shaking was a distinct possibility as the rapid deceleration or acceleration of the head can cause such an injury.

Dr Iles could not think of any explanation of accidental trauma that might account for the entirety of the infant's injuries.

I accept Dr Iles' evidence and opinion that there were additional rib injuries observable on imaging that had not previously been identified. I consider Dr Iles' evidence adds to the overall evidence pointing to a number of traumatic injuries which occurred at different times for which no plausible explanation has been provided.

Consideration of medical evidence

The medical experts were provided with copies of transcripts from the infant's parents' testimony at inquest. All rejected the possibility that the infant's injuries could be explained on these bases. The possibilities were:

(1) The stumbling toddler carrying a plastic pot which may have come into contact with the infant.
(2) The older sibling falling on the infant's middle area as the infant lay on the floor.
(3) The father's account of his discovery of the infant in a cyanosed condition and not breathing, and his response to that situation. He did not report shaking the infant at this time.

Conclusion

I accept the medical evidence before the inquest which conclusively agrees the infant died due to traumatic head injuries. I note in particular the evidence indicating there were two distinct occasions of traumatic head injury. The first occurred up to approximately one month prior to the infant's death and the second injury most likely occurred on the day of the infant's final collapse requiring admission.

I accept the medical evidence that these injuries were traumatic and, in the absence of any plausible explanation, the injuries are most likely non-accidental.

I accept the medical evidence that the three stated explanations are inconsistent with the injuries the infant sustained.

While there was some information before the inquest suggestive of the possibility the father might have shaken the baby with some force in an effort to elicit a response, the father did not give this explanation to the court even after being directed to provide his evidence in a forum where his evidence could not be used against him.

It therefore remains undetermined precisely when and how the infant sustained the varying injuries evident at autopsy. I note the evidence before the inquest indicates the likelihood the infant's final deterioration which led to death, would have occurred instantly, within minutes or up to a matter of hours after injury.

It remains a matter for the police whether they consider there is sufficient evidence to charge any particular person in relation to the infant's death. An inquest of course has broader scope and different rules of evidence and procedure than a criminal proceeding. As well, evidence provided to an inquest after a direction from a coroner cannot be used in criminal proceedings other than a proceeding for perjury.

Findings pursuant to s. 45 of the *Coroners Act 2003*

(a) The identity of the deceased has been established.

(b) The infant died from traumatic head injuries. The head injuries most likely occurred on two separate occasions in approximately the month before the death. The circumstances in which the injuries were

sustained have not been identified. The injuries are not accidental and are consistent with forceful shaking, with or without impact. The latest injury is likely to have caused the infant's deterioration within a matter of hours and therefore probably occurred on the date of admission to hospital.

(c) The date of the infant's death has been established.

(d) The infant died at the Mater Children's Hospital, Raymond Terrace, South Brisbane in Queensland.

(e) The infant died due to traumatic head injuries including subdural haemorrhage, intracranial haemorrhage, ischaemic necrosis of the brain, cerebral oedema and axonal injury.

Non-Publication Orders

I order there be no publication of the infant's name or that of the parents or siblings or any witness appearing before this inquest who is a relative.

I order there be no publication of the name of the child care facility the infant attended, or the names of its employees who gave evidence in this inquest.

I thank all those who have assisted in the investigation and inquest and now close the inquest.

Chris Clements
Deputy State Coroner
6 December 2012