SUDDEN DEATH IN ABORTION

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Read by Dr. G. Raleigh Weigall at a general meeting of the Society held on Saturday, 20th May, 1953, at 8.30 p.m., at the British Medical Association Hall, Albert Street, East Melbourne.

[Editor's Note: Whilst in London, Mr. P. D. Phillips, O.C., arranged with the Medico-Legal Society, London, to make this paper available for reading at a meeting of this Society. Professor L. Townsend, Professor of Obstetrics and Gynaecology at the University of Melbourne, Dr. H. F. Bettinger, Director of the Department of Pathology at the Women's Hospital, Melbourne, and Dr. K. M. Bowden, Government Pathologist, were invited to speak to the paper. Their observations are printed in full after Dr. Teare's paper, as are also observations made by Dr. Arthur Hill, who was present as a guest of the Society.

The Society desires to express its gratitude to the Medico-Legal Society, London, both for its action in making the paper available in the first place and for permission to reproduce the paper in these Proceedings.]

THE Abortion Committee in 1939 estimated that between 110,000 and 150,000 abortions occurred annually in this country. They also estimated that 40 per cent of these cases were criminal abortions. In an analysis of 1,000 abortions in America, Sitz estimated that 40·3 per cent were unnatural, and that of these, 35 per cent were self-induced—the remainder being, as he describes them, criminal. If my figures indicate an even higher incidence of criminal interference, it is because, as one would expect, those that die have been subjected to the greatest degree of violence in the attempted abortion.

The general public—and I think one might say the educated public—does not realize the frequency of abortion in this country, and more particularly, cannot appreciate the mortality and morbidity which results from abortion.

It is impossible to estimate the morbidity following abortion, i.e. the chronic ill-health and sterility which may follow infection of the pelvic organs from this cause, but I hope to give you some idea of the mortality associated with abortion, and you must remember that I have experience of certainly no more than one-quarter of the fatal abortions occurring in the metropolitan police area. On the basis of the population of England and Wales, it would be reasonable to suppose that my figures should be multiplied by at least 20 and probably much more to give a picture of the mortality from abortion throughout the country.

I should like to accentuate the scale of modern abortion by telling of an abortion service which was run up to eighteen months ago in Middlesex. Contact with the abortionist was made through a series of Palais de Danse—an appointment having been made by letter. The patient or client was met at Ruislip station by a car, in the window of which was placed the letter, so that recognition was easy. The same private car service returned the client to the station an hour later, after interference with pregnancy had been achieved by means of a Higginson's syringe, fitted with an extension made of bamboo. For South Coast residents a similar service was available at Torquay on Saturdays and Sundays for fees ranging from 20 to 100 guineas. This enterprising abortionist had also interested himself in the by-products of his art, since he not only committed rape by subterfuge on the excuse of a "special" examination, but also had a hidden camera in his room by which he obtained photographs, which I believe were of some commercial value. Though obviously well versed in the business side of his profession, he had not a great knowledge of asepsis or bacteriology, and it was the *clostridium Welchii* or gas gangrene organism which, as in so many other cases, proved his undoing.

I only wish that I had been present when the police called on this versatile practitioner. According to an eye-witness's account, he was not in any doubt as to the nature of this call and proceeded to escape via his neighbours' back gardens, only to be brought down at the sixth fence and in a very muddy cabbage patch by a burly but athletic C.I.D. sergeant.

The death which resulted in the conviction of this abortionist and his secretary is only one of the 89 cases which I propose to review, and we might now analyse these 89 cases under different headings. Firstly, the age and social state of the victims. This

table shows that the age incidence reaches a peak in the 26-30 age bracket, and that the social state, married as against single, separated or widowed, does not appear to matter.

I am entirely unequipped to discuss the sociological aspects of abortion, but it has been very forcibly impressed upon me that in not one but many of these cases of abortion in married women, it has been the cramped housing conditions which have led to attempts to end a pregnancy in an otherwise happy and productive marriage.

The degree of pregnancy in my figures agrees, I think, with the findings of others—that is to say, the peak is reached in the third and fourth months of pregnancy when the diagnosis is certain, but before the physical changes are obvious to others. Nevertheless, it is remarkable that attempts should continue into the seventh month, when, without quoting figures, the risks must increase enormously.

The Aetiology: The responsibility for abortion is probably the most difficult to assess. In this series, I have tended to the most commonsense but I hope most charitable explanation of the agent responsible, and you will see that in 13 cases the abortion would appear to have been a natural event. That is to say, there has been some pre-existing natural cause, malformation of the uterus, disposition of the placenta, associated kidney disease, or other morbid condition which may spontaneously result in abortion. Ten cases are thought to be accidental, that is to say, resulting from hygienic syringing, falls or other injuries; in 13 cases, the aetiology is quite unknown, generally speaking because of the length of time which elapsed between abortion and death; 25 were thought to be self-induced. Of the remaining 26, criminal charges were brought in 14 cases, and in the other 12 there was every reason to suppose that criminal interference has occurred. Of the 14 cases, conviction resulted in 12 cases.

The Agent: In only 55 cases was it possible to say with certainty that instruments had been used, although in many others it was suspected, and in these cases the most outstanding fact is the popularity of the Higginson's syringe, which undoubtedly accounts for 60 per cent of the cases and, in my opinion, is probably responsible for an even greater proportion of successful abortions.

It would be reasonable to suppose that half the cases in which the aetiology is unknown were criminal in origin, which brings the total of criminal cases to 57, or 64 per cent of the total in the series.

It is with the cause of death that we, as pathologists, are particularly concerned, and in analysing these causes I have compared the total incidence throughout the series with the incidence during the last five or six years—that being the period during which penicillin has been available for treatment of the general public. You will observe that peritonitis and septicaemia, which claim almost a third of the total victims in the period, have in the last five years accounted for only six deaths. The more sudden causes of death such as shock, air embolism and haemorrhage have, however, increased proportionally, as one would expect. Infection by the gas-forming organisms and death from kidney involvement have both slightly increased. As one might expect, the shorter the interval between abortion or interference and death, the greater the chances of determining the aetiology and the criminal.

There are rarely any medical witnesses of these types of death, and those professional persons who may have witnessed such forms of death in abortion have, wisely you may think, not seen fit to commit their observations to any recognized medical journal. Occasionally a full statement by an amateur and observant abortionist may give some indication of what happens in these circumstances, but in the main we have to presume the course of events by analogy with surgical catastrophes where conditions are not the same.

In cases where surgery causes shock, the patient is generally under light anaesthesia or heavy sedation, and the attempts at resuscitation frequently obscure the exact time and mode of death.

Similarly, in cases of air embolism by way of the systemic side of the circulation, the patient is also generally under an anaesthetic. Air embolism resulting from penetration of vessels in the lung, such as may result from the treatment of tuberculosis, is not entirely analogous to air embolism in abortion, since the route traversed by air to the vital centres is shorter and more direct in lung cases.

Despite these difficulties, we can now, I think, say with certainty that the suddenness of the death which occasionally occurs in dilation of the mouth of the womb or other intra-

uterine manipulation can be measured in seconds, and similarly, the air embolism which occasionally results in attempts to insufflate the Fallopian tubes may kill within minutes.

A few words must be said on the mechanism of these forms of death in abortion.

Air embolism occurs when frothy fluid is injected into the pregnant uterus under pressure, usually by means of an ordinary domestic enema syringe. The pressure achieved by these instruments may reach 100 cm. of mercury—that is, three atmospheres —such a pressure is naturally capable of causing considerable disruption of the normal anatomy of the pregnant uterus.

The contents of an enema syringe are, of course, expected to be fluid, but froth is usually present, either as the result of imperfect filling of the syringe before the operation, or as the result of the distal end of the syringe lying in soapy froth above the level of the fluid in use. Most abortionists use a solution of soap or Dettol or some other antiseptic.

Once injected into the pregnant uterus, the frothy fluid strips the membranes and detaches the placenta from the uterine wall, thus laying open the mouths of the uterine vessels. As the pressure created by the syringe is considerably greater than the venous pressure, the froth rushes into the circulation to reach the heart. Here it may kill by blocking the circulation of blood to the lungs, or by passing through the lungs to reach the coronary and cerebral arteries.

Shock or vagal inhibition, on the other hand, occurs when there is a sudden dilation of the mouth of the womb by the introduction of an instrument, or when the lining of the womb is scalded or otherwise stimulated by the introduction of hot or corrosive fluid, and is a nervous mechanism resulting in vagal inhibition which stops the heart.

From the purely scientific approach there appear to me to be two lines of research, along which we may eventually gain some assistance in assessing whether death was sudden or not.

It has been known for years that people dying suddenly show at post mortem less tendency to clot formation than those dying slowly—recent work by Mole of Oxford has shown that this is due to the presence of fibrinolysin in the blood of those dying suddenly—and early figures tend to show that the more sudden the death, the higher the strength of fibrinolysin present. Whether these estimations will ever be sufficiently accurate to enable us to state with certainty whether death was sudden

or not, I am not prepared to say, but I think it is a reasonable line to approach.

The second purely scientific investigation is one which I have only been able to perform in a small number of cases, and depends on the presence of cresols in the fluid introduced. Cresols are of course present in carbolic soap and lysol—solutions of which are frequently used for the purpose under discussion. My course of investigation is to estimate the percentage of cresols in the blood in the right heart. In sudden death from abortion, I have found the percentage of cresols in the blood to be approximately twice normal, but the few figures I have obtained are not really worthy of consideration as yet.

I may say, however, that I have not come across any obvious fallacy in either the chemical technique or the interpretation of the results, and I would commend this investigation to my forensic colleagues and ask them to communicate their results.

These two investigations are as yet in their infancy, and in practice we have to rely on experience to estimate the rapidity of death.

Perhaps the first point which we may dispose of is the question and possibility of self-infliction or self-instrumentalization. That this possibility can never be denied is well illustrated by the following case.

Mrs. C. lived in a prefabricated house in Middlesex, with her son John, aged one year and eight months. Her husband was a serving soldier stationed many miles away.

At 9 o'clock in the morning of April 16, 1947, a neighbour, heard John crying. He continued to cry at intervals until 12 noon, when Mrs. T. noticed that Mrs. C.'s bread and milk were still on the doorstep.

Mrs. T. could obtain no answer to her knocks, and gained entrance to the house through the kitchenette window. On entering the hall she saw Mrs. C. in the lavatory, the door of which was wide open. She was sitting on the seat with her head thrown back, and on the arrival of the police surgeon was found to be dead. Death was thought to have occurred 12 hours previously. On the floor of the lavatory a chamber containing white fluid was found. The body was fully clothed except for knickers, which were found neatly folded on a chair in the living room. Over the back of the chair was a pair of pyjamas, and it was subsequently ascertained that it was Mrs. C.'s habit to undress and dress in the living room to avoid

disturbing John in the bedroom. All the electric lights in the house were on except that in the bathroom. An enema syringe, apparently recently used, was lying on the draining board of the scullery. The front and back doors of the house were bolted on the inside.

Post-morten examination was performed five hours after the discovery of the catastrophe, and approximately eighteen hours after the death. It showed the deceased to be a well-nourished adult woman.

On opening the skull, a few small bubbles of air were found scattered through the cerebral arteries and veins. Numerous small bubbles of air were seen in the superficial branches of the coronary arteries on the surface of the heart. The larger coronary arteries also contained bubbles of air, and the right side of the heart and pulmonary artery were packed with frothy blood. There was a slit patency of the foramen ovale 1·25 centimetres wide, and an occasional bubble was seen in the left heart and the aorta.

There was a quantity of blood-stained mucus in the air passages, and the lungs showed a haemorrhagic type of oedema.

The uterus was greatly enlarged and contained a foetus of twenty-six to twenty-eight weeks gestation. The mucus plug in the cervical canal was disturbed and blood-stained, and the membranes were separated from the posterior wall of the uterus up to the insertion of the lower border of the placenta. A quantity of frothy fluid was found in the cavity so formed, and air bubbles could be traced into the uterine veins and vena cava. A small abrasion 1·25 centimetres in diameter was seen in the posterior wall of the vagina. The enema syringe was found to be fitted with the long red perforated nozzle used for douching.

There was no doubt that this woman had died of air embolism following the introduction of soapy fluid into the pregnant uterus. When the husband was interviewed, he stated that he was well aware of his wife's condition, that the baby was expected in July, and that his wife was attending a local doctor for ante-natal treatment, and had made every reasonable preparation for the birth. All this proved to be true. He also stated that he had known his wife to use an enema syringe for vaginal douching, particularly in Egypt, where they were married.

It would appear, therefore, that this woman, on the night of April 15, was preparing to go to bed in the usual way and took with her to the lavatory an enema syringe and a bowl of

diluted antiseptic solution. After douching herself, she walked to the kitchen (a matter of six or seven steps in this type of house) and laid the syringe on the draining board. She was able to return and sit on the lavatory seat before the effect of the air embolism killed her.

This case immediately raised the question of the amount of voluntary movement possible after the introduction of froth into the uterus. It would appear that this woman was capable of walking 15 to 20 paces before the air embolism took effect. In another case of apparently self-inflicted abortion, a woman was found on the kitchen floor, the door locked on the inside, with her clothes rolled up around her waist and a bowl of soapy water by her side. She had died of air embolism and the enema syringe, recently used, was found in a cupboard above the kitchen sink and about four paces from the body.

A comparatively reliable eye-witness's account of the behaviour of dying from air embolism arose through the finding of the body of a woman of 27 on the pavement of a road in Willesden in April 1945, in the early hours of the morning.

When I was summoned I was informed that she had marks on her throat, and my preliminary investigation showed that these marks, actually on the upper part of her chest, were second degree burns which showed a lattice pattern identical with a utility type of hot water bottle, a specimen of which I happened to have at home. Since it seemed unlikely that anyone would carry a hot water bottle about in the street on a warm August night for the purpose of resuscitation of a casual body, we came to the not unnatural conclusion that this woman had died in a house, and that attempts had been made to resuscitate her. The immediate assumption was, of course, that she was a victim of an abortion or attempted abortion. The post-mortem showed this to be so; she was a clear case of air embolism occurring at the earliest stage of pregnancy which I have encountered—about eight weeks. She lived in Clapham, but her diary contained a note: "Nurse now at 88 —— Road, Willesden", which was almost opposite the place where she was found. When the so-called nurse was interviewed, she made a clean breast of her activities, and after describing the instrumentation, stated that the girl had got up from the couch and was pulling on her jacket when she suddenly collapsed to the floor, with froth issuing from her lips.

In another case the only clinical observation made by the abortionist was that the dying woman's eyes were seen to be rolling before death, which occurred in a matter of seconds. In another case, police arriving fifteen minutes after the beginning of an attempted abortion found the client to be dead. In a sixth case, a woman of 42 with seven children retired to bed at 11 p.m. At 12 midnight her husband heard a thud, and on going upstairs found his wife slumped against the bed partially dressed. Beside her was an enema syringe and a bowl of Dettol. She muttered "Sorry" or "Save me", and a doctor who attended immediately found her dead at 12.10 a.m.

In these six cases, apparently frank statements were made to the police—in one case, it must be admitted, when it was indicated to the abortionist that her original story suggesting a natural death would not hold water. And consideration of the evidence in these cases leads me to the conclusion that unconsciousness supervenes within two minutes and death within ten minutes of the introduction of frothy water into the uterine circulation, and that only the simplest and limited voluntary movement is possible during that time.

Armed with this information, the police have in some cases persuaded suspected persons to alter their original stories, but those, of course, whose stories eventually describe the finding of the deceased woman with an enema syringe and a bowl of soapy water by her side can hardly be convicted of manslaughter on the pathologist's evidence, since we have already admitted the possibility of self-infliction.

Experience in the case of shock can be illustrated by the story of Miss L., whose death was reported to the police by a Mrs. B. living in Streatham. Mrs. B. explained that she had found Miss L. leaning on the railings outside her house and had asked her to come in, as she obviously was not well. Miss L. had sat down in a chair in the sitting room, and while Mrs. B. went to get a cup of tea she had suddenly collapsed, and was dead on Mrs. B.'s return. Miss L. was found to be three months pregnant, and her uterus contained almost two ounces of a very strong solution of lysol—sufficiently strong to "fix" the lining of the uterus. There were, however, no burns in the vagina nor on the thighs, and it seemed reasonable to suppose—had this woman been capable of walking about after the introduction of the fluid—some of it must have run from the uterus to the vagina and probably on to her thighs. Mrs. B. was

informed of this view, and after several attempts at prevarication she admitted that Miss L. had called upon her by appointment, and that she introduced the strong solution of lysol into the uterus by means of a syringe, when to her horror the girl had collapsed and died.

The cases of haemorrhage which I have seen have generally been characterized by very severe lacerated wounds of the birth passages, and in the main have been self-inflicted. As an example, here is a slide illustrating severe injuries to the vagina caused by a knitting needle. This woman was married to a professional man and in a business on her own account. She became pregnant, but did not wish to give up her work. In her seventh month of pregnancy she undoubtedly inflicted these injuries on herself with an ordinary knitting needle, and was found lying in a blood-soaked bed by her husband. Her condition was so severe as a result of haemorrhage that although she was admitted to hospital, it was never possible to perform any major surgical operation upon her.

It is generally agreed, I think, that the more severe the injuries, the greater is the likelihood that they have been self-inflicted, but my experience does not lead me to believe that the converse is true.

In the diminishing group of peritonitis and septicaemia, I do not propose to go very far, except to say that even after intervals of three weeks between instrumentation and death, assiduous investigation of the Criminal Investigation Department has on occasion led to arrests and charges.

I have purposely separated the Clostridial infections from ordinary septicaemia because of the rapidity with which these Clostridial infections kill. These are the organisms such as the bacillus Welchii, Oedematens and tetanus, which flourish on dead and dying tissue, particularly on blood clot and in anaerobic conditions. They find an ideal medium for growth in the pregnant or recently pregnant uterus full of blood clot. They are spore bearers, and resistant to the simpler forms of sterilization. Some of them are found in the human bowel, while others exist in soil, earth and dust. The speed with which they kill—and particularly the Welchii and Oedematiens organisms—is quite remarkable. They spread through the body with amazing rapidity, destroying the red blood cells, and causing gas formation in solid organs, and producing a bronzed lividity about the body which is, in itself, almost diagnostic. Rarely do the

victims of this fulminating infection reach hospital and, in my experience, the shortest period which has elapsed between instrumentation and death is 17 hours, and the longest, three days. To be able to inform the police that the probable time of instrumentation was some 36 to 60 hours before death is valuable in that it enables them to limit their investigations to the deceased's activities in that period, and I am not convinced that these organisms can gain access to the pregnant uterus except as the result of instrumentation.

In a recent case of this nature, a pure growth of the Oedematiens bacillus was obtained from the infected uterus. I was subsequently handed a piece of slippery elm bark, which had been taken from the suspected abortionist's house. It also gave a pure growth of Oedematiens, which is, relatively speaking, a rare organism, and its presence in the uterus and on the suspected material was one more link in the case for the prosecution.

The problem of kidney damage following abortion is one which is being tackled throughout the country at the moment. The picture of tubular degeneration of the kidneys, with red cell debris blocking these tubules, is comparable with that seen in blood transfusion mishaps, and in the crush syndrome, of which we saw so much during the war. This complication commonly supervenes some seven to ten days after the abortion, not infrequently at a time when the patient appears to be "out of the wood". The aetiology is as yet obscure; the bacteriology of the uterus does not differ from that of cases which recover without any complications, and it would appear at the moment that the absorption of toxic material from the necrotic lining of the uterus is the most likely solution—if, indeed, the syndrome is identical with that of a mismatched blood transfusion and crush injury.

Only last week, a coroner told me what he thought of nasty-minded pathologists—as he put it—who considered that all fatal abortions were the result of criminal interference. That allegation is not quite true, but it is remarkable how frequently in cases where the agent and aetiology are obscure, one finds a very good reason for criminal abortion. The married woman who has been living with a coloured man during the absence of her husband, and is afraid of the child being also coloured; the woman whose husband has been away for seven months and finds herself three months pregnant, and has not, perhaps, the

same belief in the elasticity of the period of gestation as have some of our eminent judges. Examples like these lead one to approach the problem of death from abortion with a suspicious mind. I am sufficiently sanguine to doubt whether our observations as pathologists will do anything to diminish the incidence of death from abortion in this country. Any reduction in the incidence, in my opinion, will result from improved methods of treatment and to a small extent from improvements in housing conditions, but the fact remains that every year dozens of healthy women of a child-bearing age, and frequently already mothers, die as the result of abortion, and take the secret of the process with them.

Discussion

PROFESSOR TOWNSEND: I am going to content myself by making three observations appertaining to the paper that you have just heard.

Firstly, in this country the frequency of abortion now is probably as high as it was 20 years ago. One in five of every pregnancy terminates in an abortion. At The Women's Hospital last year we had 7,000 deliveries, and we had 1,700 abortions. Of these 1,700, 300 were septic. Assuming that most septic abortions are induced either by the patient herself, or by somebody else, it means that at least 20 per cent of the abortions admitted to the hospital last year were probably self-induced—probably the incidence is higher than that, because of the other 1,400 which were not infected, a lot of them were probably induced, but they got away with it. The overall problem of these septic abortions has improved over the last twenty years. When I was a House Surgeon at The Women's Hospital some seventeen years ago, we had a whole ward which was filled with the infected type of case. Nowadays we have on an average three or four of this sort in the hospital. The net result is that although the incidence is about the same, treatment has improved and patients do not stay in hospital as long. In the six months that I was on the gynaecological side of the hospital, seventeen years ago, I appeared in two murder charges, as a medical witness. Nowadays, or within the last two years, in my own Unit, we have not had a death from this cause. The results of this improvement are twofold. First of all, hospitals nowadays do not have to plan or cater for a large number of septic abor-

tions, and secondly, in the female population, we do not have the ill-health and the sterility which follows septic abortion.

The second point I wish to speak about is that in this city we have been very interested in septic cases as a result of an infection caused by gas gangrene organisms. As the writer of the paper said, there are many causes of death, and one of them is infection. In Melbourne we have always had a high incidence of cases caused by the gas gangrene organism. One of our leading gynaecologists, Dr. Arthur Hill, when he was Medical Superintendent of The Women's Hospital twenty years ago, wrote a classical paper on this type of infection, and since then has led the field in research on the subject.

About 12 per cent of the admissions to The Women's Hospital of the septic type are infected by this organism. The third point I wish to make is a personal one. I want to tell you of two cases that I have had, which point out clearly that these abortions may be self-induced and are not always brought about by a professional abortionist. Only this year I had a patient admitted to the hospital in a collapsed state. A diagnosis of intra-peritoneal bleeding was made. At operation it was found that there was a large hole through the womb. The patient in her attempts to disturb the pregnancy had pushed the instrument through the womb into her abdomen, and had severed an artery in so doing. It appeared that this lady was able to bring down her womb far enough for her to actually see its mouth. She had used a knitting needle in her attempt to induce the abortion, and instead of pushing the needle in the correct direction and upsetting the pregnancy, she pushed it to one side, and it went right through the uterus and into her abdominal cavity. She achieved her aim, however, because I was the abortionist when I removed her uterus with the pregnancy intact inside it, she having been given 10 points of blood previously to make her fit for the operation.

The other case was a more remote one. This occurred eighteen years ago when I was a general practitioner in the Northern Territory. I was at Alice Springs and I received a message from the police station that a woman outback had died suddenly, and that a doctor and a policeman were to go out and investigate the circumstances. It took us five days to get there. We had to go 200 miles west of Alice Springs, and when we got there we found that the woman had been dead nearly ten days. Her de facto husband was with her. I performed a

post-mortem on the patient. The findings were that of death due to air embolism, as described in the main paper. We found the Higginson's syringe and obtained a story from the husband that the woman had been well when he left the camp. When he returned he found her dead with the syringe nearby. I then held a coroner's inquiry, as I was the local coroner. A suitable verdict was made, having heard the evidence of the policeman, husband, and myself the pathologist. The policeman, the husband and I had to make a coffin from the wood available, dig the grave, and finally I read the last rites as she was buried.

DR. H. F. BETTINGER: I wish to divide my comments on the paper we just have heard, into two groups.

First, a few words about the infection with Clostridium Welchii. With regard to this infection, we have had in Melbourne a unique experience. Between 1935 and 1944, there occurred every year about ten to twelve deaths from this condition. Since then, we have observed about two or three deaths from this infection per year, an experience which is shared by all the other medical centres in Australia and abroad. We have actually never been able to find out the reason for this extraordinary occurrence in Melbourne, nor for the sudden drop in the number of such infections. It is of particular interest that our colleagues in Sydney, who had first-hand knowledge of our work and were intently watching for similar occurrences in Sydney, were never able to see anything like the number of cases we obsvered.

I cannot agree with some of the opinions of the author of the paper with regard to pathological findings, but I do not want to go into those details here, because I think that they lie beyond the scope of the discussion to-night.

Secondly, I would like to bring to your notice two cases which occurred in the last few weeks. In the first case, I had the "nasty mind" that the author of the paper suggests pathologists have. In the other case, we were able to show that the "nasty minds" of other people were not justified. In both cases the naked eye appearances of the organs at the post-mortem examination were of no help. Practically all the organs appeared normal. However, a thorough microscopic examination provided most valuable information, and I am sorry if I have to inflict on members of the legal profession some histological detail.

The notes of the first case, which were sent to me a week ago from interstate, concern a woman of 35 years who was five months pregnant. She had been feeling perfectly well and had been going to work until one day before her death. On this particular day, she did not feel very well and stayed home. During the following night, she woke up her husband at four o'clock in the morning, and he found her in labour. A medical practitioner was summoned immediately, but when he arrived twenty minutes later the woman was dead. A post-mortem examination was carried out, and it was found that the foetus was partially born; one shoulder had been delivered; the rest of the body was still in the uterus; the placenta was separated and was lying free in the uterus. Some greenish pus-like material was present in the fundus of the uterus, but unfortunately the actual composition of this material was not ascertained. The lungs seemed congested, but there were no significant findings in any of the other organs.

With these notes, I received two microscopic slides for examination, and I have prepared a number of lantern slides from the original microscopic preparations. (Slides shown.) The first slide represents a section through the lungs and shows extraordinary changes of a kind I have never seen before. Every arterial vessel in this lung is filled with leucocytes. In the following slide, taken under higher magnification, one can recognize the details of the leucocytes and one can trace them even into the capillaries. In the following slides, one sees many more such small arteries and capillaries completely filled with the same cells. This slide shows, furthermore, in numerous alveoli large phagocytic cells which ordinarily would be called heart-failure cells. The following slides represent various levels of a section of the uterus. There are, in my opinion, very extensive and severe changes. One sees, first of all, a thick layer of inflammatory infiltrations extend through the decidua and through the whole thickness of the muscular wall of the uterus.

There are, therefore, two significant findings. Firstly, an inflammation of the uterus which in its severity was not obvious at post-mortem examination, and secondly, this extraordinary condition of the lung, this filling of all the small arterial vessels and capillaries by leucocytes. How can these findings be integrated with the details of the clinical history? The attending medical practitioner stated that there was no suggestion of any criminal interference with the pregnancy. I cannot believe that

he has been told the whole story. I think there is enough evidence in the sections to be reasonably certain about this. The condition of the uterus did not develop in a matter of minutes or even hours. Such an inflammatory penetration of the uterus right through the entire thickness of its wall had taken days to develop. Whether the greenish material found in the uterus was just pus or contained some foreign material introduced into the uterus to bring about an abortion, will remain unknown, but whatever it was, I feel certain that interference has occurred in this case. This interference resulted in pus formation in the uterus, and when during labour the placenta became detached, this pus gained access to the uterine vessels, became embolised in the vessels of the lung, and thus caused death. In this case, therefore, the microscopic studies lead to the conclusion that, in spite of the negative result of the police investigations, an outside agent must be held ultimately responsible for the death of the patient.

The other case is of the opposite kind. Actually, this death did not follow an abortion, but occurred a few hours after a full term delivery. A single girl of seventeen was delivered at the end of an uneventful nine months pregnancy. The delivery took place about six o'clock in the evening, and the young mother was returned to the ward in good condition. She was somewhat restless during the night, but this seemed natural under the circumstances. She was not certain whether to have the baby adopted or not; whether to see it at all when, as it seemed likely, she would not be able to keep it. At midnight she was given a sedative. At three o'clock in the morning the night sister spoke to her; half an hour later when the sister passed again, she had not altered her position at all, she seemed to be peacefully asleep on her arm, but was actually dead.

This sudden death raised a number of serious questions, amongst them whether a wrong dose of sedative had been given, or whether some important complication had been missed.

A post-mortem examination was performed and the macroscopic findings were entirely negative. Microscopic examination of practically every organ was carried out, and this examination revealed pathological lesions which not only explained the death but showed that it was a natural death. (Demonstration of a number of slides.) This section through the lungs shows, as in the first case, inflammatory cells; but this time they are not filling the vessels, but they are situated around them, and they

are present in every section through these lungs. Under somewhat higher magnification, one notices that all the alveolar walls are thickened, and that inflammatory cells are scattered throughout them in considerable numbers. Another slide shows that, in addition, a certain amount of exudation has taken place into the alveoli, and in still another slide one sees again the perivascular and interstitial inflammatory infiltrations and furthermore large mononuclear cells filling a number of the alveoli. Altogether, one finds all the characteristic features of an interstitial pneumonia of viral origin.

In some sections through the liver one sees not only very similar perivascular inflammatory infiltrations, but also small areas of necrosis and inflammation right in the substance of the lobules of the liver. In sections from the spleen one finds in the lymph follicles the same changes that one sees in cases of generalized infections. Finally, in sections from the heart, one observes perivascular inflammatory infiltrations which have led to damage to the heart muscle fibres. Taking all these findings together, there can be no doubt that this girl suffered from a virus infection which affected almost every organ of her body. The findings in this case are practically identical with those that were revealed in the valuable work of Dr. Bowden at the morgue in the case of babies who were suspected to have been suffocated in their cots by cushions or bed clothes. As Dr. Bowden in his series, so were we able to show, on the basis of a very full microscopic examination, that in this case the death of the patient, in spite of being so sudden and unexpected, was due to natural causes.

DR. BOWDEN: Mr. President and gentlemen. I cannot let that remark of Professor Townsend pass without comment, that the medical practitioner, in these cases of abortion, goes to court to take his hiding in the witness box, as usual. I do not think that the doctor need step into the witness box with any fears providing he is adequately prepared. There is one barrister in this city who stands high in the esteem of the coroner. He achieved his standing in this way. He was concerned in a case of fatal abortion, and not knowing very much about its medical aspects came to me for some assistance. We discussed some of the more difficult medico-legal points, and shortly afterwards I appeared in the witness box to be cross-examined by him. He conducted a thorough and vigorous cross-examination; so well did he do it,

that after the inquest the coroner said to me, "I was very impressed with the way you were put to the test; doesn't that barrister know his stuff!"

To come to the matters under discussion to-night, I would say that there is no doubt that the picture of abortion as we see it or death from abortion has changed in the last few years, and our experience here closely follows that of Dr. Teare in London. In his paper he mentions firstly the incidence of abortion, goes on to say something about the manner in which abortion is brought about, and then directs his attention particularly to the causes of death.

When I commenced work as the pathologist to the City Coroner of Melbourne, death from abortion was fairly common and usually resulted from infection, the woman frequently succumbing to peritonitis or a blood-borne infection, but, owing to the introduction of modern chemotherapy the picture has changed. We still see an occasional death from peritonitis, some cases where death ensues from anuria or renal failure, and cases where death occurs suddenly from vagal inhibition or air embolism. In the latter cases, the women die suddenly and dramatically in the hands of the abortionist, and the abortionist may be caught with a dead body on her hands. If she panics she is likely to find herself in a very difficult position. Some recent convictions of abortionists in our courts have happened in this way.

Although a woman may appreciate the fact that there are terrible risks in putting herself in the hands of an unskilled abortionist, she may run all risks, so determined is she to get rid of her pregnancy. When I was practising in the country a young married woman with two children came to me and told me that she had just returned from Melbourne from a visit to an abortionist. She explained that the abortionist had inserted a rubber catheter into her womb and told her to return home and if nothing happened in thirty-six hours she was to pull the catheter out. She came home by train; nothing happened in thirty-six hours, so the catheter was pulled out. Some doubt then arose in her mind as to whether she was really pregnant, so she came to me and said that she would like to be examined. If she was pregnant she said she would like to have the baby. Having taken her in good faith and having examined her and told her she was pregnant, I thought at the same time I would teach her a good lesson, so I sat down and explained to her

some of the dreadful things that could happen to her as a result of a visit to an abortionist. Her response was, "Oh yes, doctor, I have been very silly, I realize that now. What a lucky escape I have had. I shall go over to see the matron of the hospital now that you have told me when the baby will arrive and I'll make the necessary arrangements at the hospital for my confinement." But she followed that up by boarding the evening train for Melbourne, returned to the abortionist, and had the catheter inserted a second time. On this occasion she did abort, but was about in the home town a few days later as though nothing had happened. She suffered no ill consequences.

Circumstantial evidence in these cases may be misleading. I had to go one Sunday afternoon some years ago to a country town to carry out an autopsy on a woman who had died after an abortion. The evidence strongly suggested that this woman had been in the hands of an abortionist. She had gone to Melbourne for a day and a few days later consulted her doctor in her home town. She was then very ill and was suffering from septicaemia as a result of an abortion. The doctor said to her, "Are you one of those clever women who can bring on an abortion yourself?" The reply was "I am not clever". It was concluded that she had visited an abortionist. I had with me the mortuary attendant who sews up the bodies at the conclusion of the autopsy. When we arrived at the country mortuary he was mistaken for the pathologist and introduced to the corpse with some ceremony. Eventually we discovered a long grooved mark along the back wall of the womb of the deceased woman, and it was thought also that she might have been syringed. The grooved mark suggested the introduction of an instrument such as a knitting needle.

The detective who was with us decided to go to the deceased woman's residence and search it. On top of the wardrobe in her bedroom he found a box containing a length of fencing wire and a Higginson's syringe. On squeezing the bulb of the syringe mucus and fluid came out of the end. This showed that almost certainly this abortion had been self-induced—despite the circumstantial evidence to the contrary, it was another example of a self-induced abortion.

There is no doubt that self-induced abortions are very common. In fatal abortions the question often arises, "Could this woman have procured the abortion herself?" You will notice

in Dr. Teare's paper that he says in these cases we admit the possibility that the abortion could have been self-induced. Nevertheless it would be most unlikely that a woman who had not previously given birth to a child, with the organs in their normal position in the pelvis, could introduce herself the nozzle of a syringe, or a knitting needle, or a catheter, or some other object, into her own womb to bring about an abortion.

The pathologist may find himself in a dilemma in some of these cases. In a country town recently we were asked to make a post-mortem examination on the body of a woman who had died in coma ten days after an abortion. The story was briefly this. This woman, a single girl, had left her place of employment on the Friday afternoon and did not return home. On the following Sunday afternoon she was taken to a doctor's surgery where she was found to be in the act of aborting. She was sent on to the local hospital, where she was admitted in a coma and where she aborted a foetus. She lay in bed for ten days in a coma with no equivocal signs referable to the nervous system. Blood cultures were negative, and the coma was a diagnostic puzzle. Post-mortem examination showed an extensive bronchopneumonia, but no signs of interference with the uterus and nothing obvious on naked eye examination of the brain or any of the remaining organs. Microscopic examination of the brain showed a clearcut encephalitis. The autopsy did not enable us to say how that abortion was brought about. The police investigation strongly suggested that this woman had left her work on the Friday to visit an abortionist, and had undergone an illegal operation, but the problem that confronted us was whether the abortion was due to encephalitis, or whether she had lapsed into a coma for ten days following an abortion, the encephalitis being a sequel to the abortion. We were not able to say, and although the circumstancial evidence favoured the latter conclusion, we were not of decisive assistance to the court in that instance.

On another well-remembered occasion a doctor rang me up one night and told me that he had had an unfortunate experience; a woman had died in his surgery during an asthmatic attack. He had issued a cremation certificate, but the doctor who was asked to sign the second cremation certificate refused on the ground that the deceased had died in a public place. It was decided to refer the matter to the coroner, who ordered a post-mortem examination. The deceased had been a sufferer

from severe asthma for many years, and had been told by her own doctor that it would be most unwise for her to have another child. For this reason she was on her way to the doctor's surgery previously alluded to, in order that a ring could be placed in her womb to act as a contraceptive. On walking into the doctor's surgery at the pre-arranged time the deceased woman, it was alleged, suffered a severe asthmatic attack and asked for some adrenalin. This was given, but death occurred suddenly. At the autopsy, it was quite obvious that the deceased had suffered from asthma, but to my surprise it was also quite obvious that she had been rather expertly curetted just before her death. The problem was this: "Did she die in an asthmatic attack, or did she die suddenly at the conclusion of and due to being curetted?" The detectives could gather no definite evidence as to where and when this woman was curetted, and there was I stuck in this position, having to admit that although this woman had been curetted on the morning of her death, it was also possible that she could have died in an asthmatic attack after the operation was carried out. So it is not always easy for the pathologist, and sometimes we are in great difficulty in attempting to help the court in its search for the truth.

Gentlemen, there is great scope for discussion on this subject of abortion and the reasons for its prevalence. Dr. Teare in his paper commented on the housing situation as a factor. The only case I have seen of quinine poisoning was brought about in that way. A woman, recently married, living in one room with her husband, both working, was not desirous of having a baby because of the housing difficulty. When she found she was pregnant, accompanied by her husband she went to a chemist and purchased an ounce of quinine, about one hundred times the usual dose. She heated all of it in a saucepan on the gas, having added a quantity of wine, and gave her husband some to drink. He promptly vomited, wherefore she drank the remainder. She developed acute quinine poisoning and died, but the pregnancy was, as is so often the case where drugs are taken, undisturbed. Was her husband chargeable with an offence?

DR. HILL: I am afraid I have come here to-night purely as a recipient, and I am very grateful for the privilege of being here.

The subject of abortion as we see it, of course, is the clinical study met from day to day at the Women's Hospital, where

it so happens we are particularly interested in infected abortion. And the one infection which causes most abortional deaths in this city, in this State, and, we believe, in this country, is the bacillus Welchii infection which has already been mentioned.

I had thought from its title, "Sudden Death During Abortion", that this paper was to deal with deaths occurring during the process of abortion, that is, death from such causes as shock, haemorrhage, air or fluid embolism, and so on. So I have no prepared material on the subject to offer. I would simply like to make, therefore, one or two observations on the subject of bacillus Welchii infection.

The Welch bacillus is a most interesting organism because it possesses great clinical versatility. It appears in a number of distinct types of disease, some of which can cause death with the speed of vascular catastrophe, overwhelming shock, and things of that sort. It can also produce jaundice, destruction of the blood, and kidney failure; and it is this clinical versatility which has been chiefly responsible for its not having been clearly understood in the past.

One important fact is the relative frequency of these infections in Australia. Why they are so common here we do not know. The fact that this is a sheep-growing country, our type of diet, climate, economic conditions, these and many other factors have been considered, but so far without providing a solution. These infections were very common while the Americans were here, but they have also been common at times since they left. We do not yet know the answer.

To give you some idea of their frequency, I recall one year in which some 600 of the three to four thousand women admitted to the Women's Hospital suffering from abortion were found by Dr. Butler to have bacillus Welchii in the genital tract. Of the 600, only twelve to fifteen had a definite clinical infection, yet ten of them died.

We know that in abortion infected with bacillus Welchii the bacteria reach the genital tract by contamination, not from garden soil or street dust, but from the patient's own rectum. The genital tract of woman has never stood in splendid isolation, whether from the approach of man or from the entrance into it of bacteria from the large bowel, and contamination of the vagina from the rectum has been a common occurrence through the ages. This contamination can occur readily during childbirth, and even more readily during criminal abortion. It is therefore

clear, in the survival of the human race, that the genital tract must have developed a very strong biological immunity against bacteria liable to enter it from the bowel.

Now that brings us to one point touched upon in the paper you have just heard. It has been accepted for many years that the Welch bacillus requires tissue damage before it can start infection and invade the patient. In many cases seen by the general surgeon this is true, but it is by no means the whole truth. In civil and war wounds the patient commonly suffers grave local damage, crushed and devitalized tissues, complete loss of blood supply to parts, and so on; and we believe that if practically any of the 600 groups of Welch bacilli already quoted as appearing in the one year at the Women's Hospital were to gain access to such wounds, they would produce clinical infection, and often of a severe or fatal order.

In the genital tract of a woman who is aborting the conditions are entirely different. Here we have a strong natural immunity, a magnificent and intact blood supply, and an amount of tissue damage which is in no way comparable with that just described, which, in fact, is in general so slight that it is difficult to detect it. In such conditions it requires a very good Welch bacillus, that is, one of a particularly virulent nature, to produce serious clinical infection. During the war, Dr. Butler was able to confirm these views, and found that Welchii bacilli which caused grave abortional infection were identical in character with those which caused fulminating infection in men.

The introduction of penicillin has helped a great deal in the management of these infections, although penicillin alone will not save the worst of them. In these, urgent concurrent measures are essential: antitoxin, alkalis, blood, surgery, and so on. Abortionists to-day know something of the literature, and there is no doubt that many give patients some sort of a "cover" of penicillin and other agents, thus lessening the incidence and severity of subsequent infection.

Dr. Bettinger said that in recent years bacillus Welchii infections in Melbourne had become less common and less severe. I would qualify both statements. Fluctuations in frequency have always occurred, and just now the frequency of these cases is apparently once more on the rise. Secondly, although if we see and diagnose them easily enough we can save the majority, we cannot save them all. And in the last two months I have

seen two deaths, each within a few hours of admission to hospital.

One or two other points in this paper call for comment. The author, in speaking of fatal renal failure following abortion, suggested that its cause might be the absorption of obscure poisons from the uterine lining. We see renal deaths following abortion and believe that in these cases the cause is almost invariably determinable. Sometimes chemical or metallic poisons are taken—you have just heard of the woman who took a fatal dose of quinine; and lead was a poison which was taken fairly commonly some years ago. Some of the women taking it died of renal failure, and at death the embryo was usually still present in the uterus. The majority of cases of renal failure we meet, however, are of infective origin, and this can be accurately diagnosed. Although the Welch bacillus is the common offender, other bacteria can be responsible. In the treatment of renal failure the most important advance in recent years has been its so-called physiological management, resulting in the saving of many lives.

The author spoke of the speed with which Welchii infections kill. I have seen a woman die three hours and forty minutes after the first sign of illness, and I have seen one who was completely untreated survive for five days. As a rule, if death occurs it is within forty-eight hours of the onset of infection, but women dying from renal failure usually last longer.

This brings me to Professor Townsend's statement that the modern use of antibiotics and sulphonamides has so greatly reduced the dangers of infection that women can now face the prospect of illegal abortion without fear of even the mildest sequelae. I am afraid I cannot agree with so favourable a picture. Women are still dying from abortional infection, and some of them die so quickly that there is nothing you can do for them. The two I spoke of as dying recently in the Women's Hospital were given within a few hours of admission all the treatment we know, but they died—swiftly, quietly, and without a flicker of response. Further, among the great majority who appear to have had their abortions without complication there is the considerable pool of women who thereafter will never have children. Although apparently free of symptoms, they have had sub-clinical infection, and their tubes are now blocked. Over the years they will continue to seek help because they cannot have children. But the opening of a blocked tube is one of

the most difficult operations in gynaecology, and the majority of these women are doomed to sterility.

We feel seriously about these facts. No doubt a publicity campaign would be of great value in educating the public in the immediate and remote dangers of illegal abortion. As an additional weapon the now well-publicised Rh factor could be used. Although only one-sixth of the population are Rh-negative, the possibility of being Rh-negative should deter any young woman who knew that by having one or two abortions before settling down to serious married life she might well destroy her chances of ever having a live child.