HILLSBOROUGH - 15 APRIL 1989

PATHOLOGICAL ASPECTS OF THE DISASTER

My medical qualifications are MB, BS, FRC Path, DMJ (Clin et Path). I have been in active practice in Forensic Pathology for almost thirty years and have been Consultant Pathologist to the Home Office for South Yorkshire and the East Midlands for twenty-five of those years. During that time I have performed more than twenty-six thousand post mortem examinations for Her Majesty's coroners and have taken part in some seven hundred and sixty murder investigations.

I have been asked by Mr Mervyn JONES, Assistant Chief Constable of the West Midlands Police in charge of the Hillsborough Enquiry Team, to provide a general overview of the pathological aspects of the Hillsborough disaster in which some ninety-five persons were killed on the afternoon of Saturday, 15 April, 1989, during a cup semi-final match.

I took part in the investigation of the deaths myself, being present at the request of Her Majesty's coroner at Hillsborough Stadium on the evening of 15 April, 1989, and at the Medico-Legal Centre on Sunday, 16 April and Monday, 17 April. I personally carried out nineteen of the ninety-five post mortems. The other examinations were carried out by teams of pathologists working five or six at a time in the mortuary of the Sheffield Medico-Legal Centre at Watery Street - following the transfer of the bodies from the temporary mortuary in the
gymnasium of the Sheffield Wednesday Football Ground. Initially, I believe, some thirteen bodies were taken to the mortuary of the Northern General Hospital in Sheffield, but later they were removed from there and brought to the Medico-Legal Centre. As far as I know, the only body autopsied at the Northern General Hospital was that of a Lee NICHOL (body No 95), aged 14 years, who survived, under treatment, until about 2 am on Tuesday, 18 April, and whose body was examined that same day by Dr Shirley HOLT, Consultant Pathologist at the Northern General Hospital, Herries Road, Sheffield, S5 7AU (Tel: 0742 - 434343). The work at the Medico-Legal Centre was performed by five forensic pathologists and four clinical pathologists - all of consultant status. They were:-

Dr John CLARK  Department of Forensic Medicine, The University, Glasgow, G12 8QQ  Tel: 041 - 330 - 4574
(Bodies numbered 11, 16, 19, 22, 26, 28, 36, 41, 43, 46, 53, 58, 65, 71, 72, 79, 81, 86, 90 and 92)

Dr Lloyd DENMARK  Department of Forensic Medicine, University of Leeds, Clinical Sciences Building, St James' University Hospital, Beckett Street, Leeds, LS9 7TF  Tel: 0532 - 431897
(Bodies numbered 12, 21, 83 and 89)

Professor Laurence HENRY  University of Sheffield Medical School, Department of Pathology, Beech Hill Road, Sheffield S10 2RX  Tel: 0742 - 766222
(Bodies numbered 3 and 75)

Professor J S P JONES  Department of Pathology, City Hospital, Hucknall Road, Nottingham, NG5 1PB  Tel: 0602 - 691169
(Bodies numbered 8, 17, 25, 31, 35, 42, 50, 59, 68, 77, 78, 80 and 94)

Dr J R SHORTLAND  University of Sheffield Medical School, Department of Pathology, Beech Hill Road, Sheffield S10 2RX  Tel 0742 - 766222
I can only speak in a detailed way of the nineteen examinations which I personally carried out. However, having read all ninety-five post mortem reports and seen certain statements made by witnesses, I believe I can speak in a general way about the pathological conditions which proved fatal in the total of ninety-five cases which were examined. The details of individual cases will need to be obtained from the pathologists who examined them, which is why their names and professional addresses, together with the body numbers, have been provided above.
SEX
Of the ninety-five dead, eighty-eight were males and seven were females, which, in my view, merely reflects the nature of the occasion.

AGE
Of the ninety-five who died, the youngest was a 10 year old boy and the eldest a 67 year old man.

Thirty-eight persons (approximately 40%) were under 20 years of age
Thirty-nine persons (41%) were between 20 and 29 years of age
Twelve persons (13%) were between 30 and 39 years of age
Three persons (3%) were between 40 and 49 years of age
One person (1%) was between 50 and 59 years
Two persons (2%) were between 60 and 69 years old.

Seventy-seven of the ninety-five (81%) dead were below 30 years of age.
Again, I imagine these figures probably reflect the composition of the average soccer crowd.

CAUSE OF DEATH
In virtually every case, the cause of death was basically compression of the chest wall - against the bodies of the persons immediately around the deceased or against fixed structures such as the walls of the stadium and the crash barriers. In the vast majority of the cases, this pressure caused the condition of traumatic or crush asphyxia - the two terms are synonymous.

Asphyxia pathologically means some mechanical obstruction to normal breathing. That obstruction may be caused in a variety of ways - by a hand across the nose and mouth (suffocation), by a ligature tightened around the neck (strangulation), by a bolus of food which sticks in the airways (choking), or by
a strong pressure upon the chest wall so that it becomes fixed and cannot move in and out to enable the person to draw breath. Whatever the impedance to respiration, the result is similar. The oxygen in the air cannot be drawn into the lungs and passed into the blood to be transported to the body tissues which require it for their normal function. The deoxygenated blood in the tissues turns a dark colour, giving the victim's complexion a bluish or cyanotic hue. The heart begins to fail and the walls of the smallest vessels (capillaries) which are under pressure and themselves starved of oxygen, give way and allow spurts of red cells to pass into the surrounding tissues where they show as tiny pin-point haemorrhages (petechiae) in the loose skin around the eyes, on the forehead and behind the ears as well as on many of the internal organs. Thus, a somewhat bloated cyanotic appearance with external and internal petechiae arises. If the impediment to breathing is not removed in some four to six minutes - perhaps less if the victim is struggling and thus using up oxygen at a higher rate - then the brain cells cease to function, unconsciousness supervenes and ultimately the vital centres in the hind brain are damaged and die and then life is no longer possible.

Appearances such as these were seen in almost every person who died at Hillsborough, and in all but nine cases death was attributed solely to traumatic (or crush) asphyxia. In one case (No 76) the force compressing the chest was (perhaps momentarily) so great that the rear surface of the breast bone almost touched the anterior surface of the spine, nipping and splitting the aorta between them so that the man bled to death internally before he could be asphyxiated. In only eight other cases (Nos 3, 27, 29, 48, 69, 91, 93 and 95) were factors other than traumatic asphyxia thought to have even contributed to the death, and in six of these eight, the contributory factor arose out of trauma to the chest, neck or head. In the remaining two cases (3 and 69) only,
truly natural disease was believed to be a significant contributory factor in the death.

INHALATION OF VOMIT

In any form of asphyxia vomiting may occur before death and because of unconsciousness and the lack of the protective reflex mechanism, vomitus may be aspirated into the lungs, greatly increasing the likelihood of death. Most pathologists regard this vomiting as merely a facet of death from asphyxia and though recording it in their post mortem reports, do not dignify it with a separate heading in the cause of death. This is my view and the one I have adopted in compiling the simple statistics for this report. It has, however, to be said that for purely mechanical and obvious reasons, vomiting is more likely to occur if the stomach is distended with food and/or drink and is subjected to hard external mechanical compression. Vomiting is also more likely to occur in those persons intoxicated with alcohol.

OTHER INJURIES

In eighteen cases bones were broken - mostly ribs (thirteen cases), but in addition the bones and/or cartilages of the larynx (voice box) were fractured in three cases (47, 51 and 81) - perhaps suggesting that the throat of these persons had been trodden on accidentally ie that they were on the ground when they sustained that injury.

In only two cases were long bones fractured. In one of these cases (18), both bones in a woman’s forearm were broken and in one (11) a young boy’s femur was broken. Both injuries could have occurred as the result of accidental trampling.
In two cases impacts to the chest wall were so severe as to cause extensive bruising to the underlying lungs, affecting the victim's ability to breathe and in one of these the ribs were actually fractured and their ends tore the underlying lung allowing air to escape from the lung into the chest (pneumothorax) and seriously adversely affect the victim's breathing.

In one case damage to the nose with subsequent bleeding allowed the inhalation of blood into the lungs and this was thought to be a significant factor in the death.

As one would perhaps have suspected, a very high proportion of these bodies bore superficial grazes and scratches - evidence of blunt impact against all manner of solid objects such as walls, concrete flooring, barriers and fences. These injuries are too numerous to be described or interpreted here and details should be obtained in each individual case from the pathologist who actually performed the post mortem (see above).

ALCOHOL

In discussing this matter, my impression is that the dead came mostly from the front (ie near to the pitch) areas of the Leppings Lane end, from amongst persons who had arrived early in order to get a good view and thus their blood alcohols are not necessarily an indication of the alcoholic status of those who arrived later and were pushing to get in at the Leppings Lane end of the ground.

No blood was taken from the victim who died last ie no 95, because of the interval of time which had passed between the accident and his death.

No alcohol was found in the bodies of any of the seven female victims.

Of the remaining eighty-seven men and boys, fifty-one (58%) were shown to have…
nor more than 10 mg% in their blood, which is negligible, but fifteen had more than 80 mg% in their blood, which means they could not legally have driven a car, and six had upwards of 120 mg% in their blood. Six youths below the age of 18, who were not legally allowed to drink, had taken drink, of which group one boy, aged 17 years, had a blood alcohol of 141 mg%, whilst a 15 year old had a blood alcohol of 56 mg%.

EYE HAEMORRHAGES

I have been asked to comment on the proposition that a distinction can be made in this case between those persons who died from traumatic asphyxia standing up in the crowd and those dying from the same cause lying down. The latter, it is said, will have petechial haemorrhages in their eyes whilst the former will not. I have seen a very large number of cases of traumatic asphyxia and I am certain that no such distinction can be made - both groups will in all probability have petechial haemorrhages in their eyes.

GENERAL COMMENT

The Hillsborough disaster occurred between 3 pm and 3.30 pm on Saturday, 15 April, 1989. By 2 pm on Monday, 17 April, ie less than forty-eight hours later, all ninety-four of the victims who were then dead had been examined post mortem and had a blood sample taken for analysis, so that their bodies were ready for release to relatives. I believe that several factors were responsible for this feat:-

1. The excellence of Her Majesty's Coroner's arrangements and organisation.
2. The immediate availability of the Football Club's gymnasium, sited just a few yards from the pitch. This huge room was easily compartmentalised into three large chambers, each invisible from the others. One was used
as a mortuary for temporary body storage, one as a makeshift canteen and the third as a reception area for relatives where they were greeted and assisted by padres of various denominations, social workers and ancillaries.

3. The fact that the victims' bodies were not fragmented nor greatly disfigured as might have happened in an explosion or an aircraft crash. This meant that the initial identification was possible from polaroid photographs taken by the police, which made the identification process rapid and meant that relatives were generally required to view only one body and were spared the harrowing task of entering the main mortuary and searching for their dead.

4. The use of the facilities available at the Sheffield Medico-Legal Centre - the only building of its kind in the United Kingdom. This meant that in one day it was possible for up to six teams of pathologists and their assistants to work simultaneously in excellent conditions with modern equipment so that they were able to perform seventy autopsies on Sunday alone. This building was designed with an emergency facility to deal with disaster involving up to one hundred bodies, and when the disaster arrived, the building worked well. Sheffield City Council are to be congratulated on their provision of such a building.

Professor and Head of Department  
Consultant Pathologist to the Home Office