The pioneering work of Chanock and his associates confirmed by Rowe and Michaels has initiated a process that has defined the enormity of the problem. Closure awaits the development of effective prophylactic measures that can be applied for the health of every child.

REFERENCES

COMMENTARY
On the Treatment of Cerebral Palsy: The Outcome of 177 Patients, 74 Totally Untreated, by Richmond Paine, MD, Pediatrics, 1962;29:605–616

Comments by Arnold J. Capute, MD, MPH

This seminal paper represents one of the earliest attempts to determine the effect of physical therapy upon three types of cerebral palsy—spastic hemiparesis, spastic tetraparesis, and extrapyramidal. The groups studied were drawn from 1821 patients with cerebral palsy known to Children’s Hospital of Boston between 1930 and 1950, and formed the basis for the follow-up study of Drs Bronson Crothers and Richmond Paine. The patients were divided into two cohorts, one untreated, the other receiving intensive therapy with stratification into a mild group and a severe group. Other considerations were taken into account.

The data regarding the 177 cerebral palsy patients were previously included in the above-mentioned follow-up study, thus reasonable and detailed information were available to the type, intensity, and duration of physical therapy and similar treatment. These patients were followed until at least age 14 years. Seventy-four were accidentally or intentionally untreated, and the status of this group at follow-up examination was compared with the 103 subjected to intensive therapy, with or without bracing and orthopedic surgery. Original and serial motion pictures were available from 132 patients. The original makeup of the treated and untreated cohorts was similar as to type and severity of involvement, with mild and severe cases being evaluated separately. Cohorts were stated to be comparable as to intelligence, but the untreated group contained a higher percentage of mentally defective patients.

The patients with mild spastic hemiparesis developed a better quality of motion with or without therapy. The treated group with moderate or severe hemiparesis had a relatively better gait and fewer contractures.

Those with spastic tetraparesis had a poorer prognosis than those with hemiparesis. The authors felt that the quality of gait might have been improved and contractures lessened by physical therapy.

The gait and hand function of those treated of the extrapyramidal types were not that different from the untreated.

The physical therapy rendered was heterogeneous, using stretching exercises, “muscle training,” attempts to teach patterns of movement and range of motion of individual joints, and also functional training. It was mentioned that perhaps with more modern therapies these patients might have done better.

Of importance is Paine’s noting that the tendency of children to improve in coordination and function with increasing age must be distinguished from the effects of treatment.

This paper, written in 1962, opened a new era of encouragement for clinical trial studies to determine the effectiveness of therapy for cerebral palsy. Since this paper was published, neurodevelopmental pediatricians who focus on the interdisciplinary evaluation, diagnosis, and management of chronic encephalopathies have engaged in clinical trial studies not only to determine therapy effectiveness in cerebral palsy, but also the wide array of developmental disorders (cerebral palsy, mental retardation, learning disabilities spectrum [attention deficit disorder, attention deficit hyperactivity disorder], autism,
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ery” of surface tension lowering materials in the
peculiar to preterm infants. With the “rediscovery
versy was whether the membranes caused the dis-
brane disease were known at that time, the contro-
epidemiologic associations with hyaline mem-

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SUPPLEMENT

ABSTRACT OF ORIGINAL ARTICLE. The alveoli of
the normal lung are lined by a substance that exerts
surface tension at the air–liquid interface. In the ex-
panded lung, the tension is high and operates to increase
the elastic recoil of the lung. In the lung at low volumes,
the surface tension becomes extremely low. This confers
stability on the air spaces and thus prevents atelectasis.
This lining layer is a lipoprotein film, which is not found
where alveoli still are lined by cuboidal epithelium. Its
appearance coincides with the appearance of alveolar
lining cells. Electron microscopic evidence of secretory
activity in alveolar cells suggests that they may be the
source of the surface-active film. The normal alveolar
lining layer is not present in lungs of infants who die
from profound atelectasis and hyaline membrane dis-
cease. Whether its absence is a failure of development or
attributable to inactivation is not established.

COMMENTS

Dr Avery published this review article on the
alveolar lining layer or surfactant in Pediatrics just 3 years after the seminal article
with Jere Mead that demonstrated that saline ex-
tracts of lung homogenates from infants with hy-
aline membrane disease had high minimum sur-
fase tensions. Although the pathology of and
epidemiologic associations with hyaline mem-
brane disease were known at that time, the contro-
versy was whether the membranes caused the dis-
ease or were the result of some unknown process
peculiar to preterm infants. With the “rediscovery
of surface tension lowering materials in the
lungs by Pattle and Clements in the mid-1950s,
the mechanical effects of surface tension-lowering
substances on the lungs were investigated intensively. Avery and Mead made the first direct
connection between hyaline membrane disease and surface tension abnormalities in 1959, and in
the same year, Gribetz, Frank, and Avery reported that the pressure volume curves of lungs from
infants with hyaline membrane disease had low lung volumes and decreased stability on deflation.
These observations occurred concurrently with the initial development of neonatal intensive care and
an interest in treating preterm infants with respira-
tory failure. The result was an explosion of in-
formation about hyaline membrane disease and
 surfactant that ultimately has lead to our spectac-
ular progress in treating what we now call respira-
tory distress syndrome (RDS). Fortunately the
opportunity to observe hyaline membranes on
pathologic specimens is much less frequent now.
Dr Avery’s 1962 article is particularly interesting
because it was written when just a few pieces of
critical information about hyaline membrane disease and surfactant were available. The article explained
the effects of the alveolar lining layer on lung pres-
ure volume physiology and the implications for the
preterm infant as completely as is found in current
texts on neonatology. The article pointed out a num-
ber of unknowns in 1962 that were quickly explored
over subsequent years by many of the founders of
what would become the subspecialty of neonatology.
The predominately lipid nature of surfactant was
characterized by Klaus, Clements, and Havel in 1961. Investigators such as Adams and Fujiwara
demonstrated that infants with hyaline membrane disease had low amounts of phospholipids in lung
tissue and alveolar washes. In 1967, Brumley, Hod-
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COMMENTS

The Alveolar Lining Layer: A Review of Studies on Its Role in Pulmonary
Mechanics and in the Pathogenesis of Atelectasis, by Mary Ellen Avery, MD,

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