Pediatric strokes more than twice as common as previously reported

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Imaging studies along with diagnostic codes on medical charts show that the rate of strokes in infants and children is two to four times higher than commonly thought, researchers report in *Stroke: Journal of the American Heart Association*.

"Traditional methods using diagnostic codes work fairly well to identify stroke in studies on adults, but they miss a large proportion of cases when applied to infants and children," said Heather J. Fullerton, M.D., senior author of the study and associate professor of neurology at the University of California, San Francisco (USCF).

The inaccurate count occurs because some coders aren't use to applying stroke codes to children or are due to typing errors.

Suspecting that childhood strokes might be under-counted in research based on diagnostic codes alone, researchers from UCSF analyzed the records of 2.3 million children from 0--19 years old enrolled in the Kaiser Permanente managed care plan in Northern California from 1993-2003.

Researchers searched for stroke cases in two ways: using International Classification of Diseases, 9th division (ICD-9) codes (diagnostic codes entered on medical charts primarily for billing purposes) and keywords suggesting a stroke on radiology reports - computerized tomography (CT), magnetic resonance imaging (MRI), and angiograms. They confirmed stroke cases with a thorough chart review and compared the

methods' abilities to identify strokes.

Using the combined methods, they confirmed 205 cases of ischemic stroke (interrupted blood flow to part of the brain caused by a blood clot), yielding an incidence of 2.4 strokes per 100,000 person-years. This is two to four times higher than the previous estimates of between 0.54 and 1.2 per 100,000 U.S. children per year, which were based only on ICD-9 searches.

Although the discrepancy between actual and recognized cases is wide, stroke in children is still rare and these results should not alarm parents, Fullerton said.

"The major lessons from this work are for researchers," said Fullerton, who heads the Pediatric Stroke and Cardiovascular Disease Center at UCSF.

The team compared the search methods on their ability to identify the charts of children who had experienced a stroke (the sensitivity of the measures). The radiology search, they found, was far more sensitive (83 percent) than the ICD-9 code search (39 percent). For strokes that occurred around the time of childbirth, the discrepancy was even wider, with a sensitivity of 12 percent using ICD-9 codes for stroke, and 87 percent using radiology records.

"Studies based on ICD-9 codes may vastly underestimate the incidence and cost of pediatric stroke," she said. Because the study was limited to one healthcare organization, the researchers said they weren't certain that the limitations of ICD-9 code searches would be the same in other systems.

However, Fullerton said "our findings suggest that the field needs more prospective studies; although more costly, prospective studies can

capture more pediatric strokes by identifying them as they occur.

"Although pediatric stroke is rare, it carries a high burden of lifelong motor and cognitive disabilities," she said.

Source: American Heart Association (news : web)