

other did not might illuminate this matter. Potential problems with this proposal include (1) ethical justification for placing one twin in a potentially health-hazardous situation and (2) locating MZ female twins with different preferences for the article in question.

"Twin-Wide" Web

Use of the World Wide Web for conducting a randomized, multicenter

trial of treatment for twin-twin transfusion syndrome has been reported (Dornan et al., 2000). Transfusion syndrome affects approximately 35% of monochorionic-diamniotic MZ twin pairs, with 60-100% perinatal mortality. Treatments variously include laser ablation of anastomotic placental vessels, amniotic septostomy and serial amnioreduction of excessive amniotic fluid. According to the report, infant survival rates for these three methods are 50%, 49% and 83%, respectively.

The authors note, however, that published, randomized trials comparing these procedures are unavailable. Thus, a Web site was created for submission of patient data from multiple sources. The site is now accessible to 13 centers in the United States, Canada, England and Australia, and 7 additional centers are completing enrollment processes. Major advantages of this resource are the rapid transmission and retrieval of data valuable to twin researchers and their families. ■

Twin Assortment

First Time Transplant

Malaysian surgeon, Dr. V. Pathmanatham, performed a first time transplant when he attached an arm to a 4-week-old female twin infant born with a malformed limb ("Girl Receives Arm", 2000). The arm originated from the baby's MZ twin sister whose severe brain damage led to her early death. News of this operation was reported five months after it took place so the procedure has been successful thus far. The child was described as reaching with her "chubby, dimpled arm for the furry Garfield toy in front of her ... "

Political Dual

The world watched as the 2000 United States presidential battle edged toward a difficult conclusion. This may explain why a smaller, but equally compelling twin-based political contest in Jasper County, Missouri drew less attention ("Brotherly Love", 2000). Republican County Coroner Ron Mosbaugh sought reelection following his appointment to the position in 1998. (Mosbaugh, originally a Democrat, switched parties with the hope of improving his chances for victory.) His challenger was his MZ twin brother, Don — Don's mission was facilitated by simply altering his brother's name on campaign signs (changing R to D!). Ron proved the clear favorite on election night, but invited his twin to his celebration party. This political congeniality is

surely rare, but exemplary of MZ twins' affiliative spirit.

Quadruplets Times Two

The rise in higher order multiple births from fertility treatments is becoming a familiar story. As such, natural conceptions of triplets, quads and more inspires greater interest. The April, 2000 birth of a unique, naturally conceived quadruplet set in Boston, Massachusetts will surely excite the interests of twin researchers everywhere (Scammell, 2000). Kyle, Max, Sam and Cam, delivered at 31 weeks, have now been home for several months. They are unusual in being composed of two MZ twin sets: Kyle and Max, and Sam and Cam (Today Show, 2000). This arrangement also generates four DZ twin pairs and four MZ/DZ triplet sets. The parents have a two-year-old son, Jack, for a total of five children. The boys' father, when questioned about caring for the quadruplets, admitted that this process felt closer to a "custodial" relationship than to a "love" relationship. His response is understandable, given the countless responsibilities posed by the four newborn infants in contrast with his older singleton son. Both mother and father are, nevertheless, delighted and, awed by their exceptional family.

The simultaneous occurrence of MZ and DZ twinning in this family will not escape the notice of researchers concerned with the origins of the different twin types. As suggested above (see *Zygosity Diagnosis in Chimpanzee*

Twins), it is remarkable that available explanations for these basic twinning phenomena are not yet definitive.

Years Apart

MZ and DZ twins are unique co-celebrants on their days of birth. Very occasionally, however, twins are born days, weeks or even months apart. Twin births occurring in different years may be more unusual, but a new case has surfaced (The Jewish Journal, 2000). Obstetrician Yinon Gilboa, in Jerusalem, Israel assisted in the delivery of his twin daughter, born at 11:58 p.m. on December 31, 1999 and his twin son, born in the early minutes of January 1, 2000. The delivery was by Cesarean section. I recall working with a pair of reared apart twins whose search would have ended months earlier had they known that the few minutes between them were on different sides of October. History repeats itself yet again. A Massachusetts family celebrated the new millenium with the birth of twin sons, Aaron and Luke, born minutes apart in 2000 and 2001 (Evening News, 2001). The infants were five weeks premature. Only one is tax deductible.

17th Century Transfusion

Art informs even as it inspires. The Muiderslot, a medieval castle outside Amsterdam, the Netherlands holds a painting that will pique the interest of

all twin researchers and clinicians (Berger et al., 2000). “De Wikkeld kindren” (The Swaddled Children) depicts a pair of infant male twin who most likely succumbed to twin transfusion syndrome. This is suggested by their marked difference in coloring — one twin’s face is red, while the other twin’s face is white. Other fine details in the painting suggest that the artist portrayed his subject matter faithfully. The infants in question were the children of Amsterdam Mayor Jacob Dirkszoon de Graeff (1571–1638) and his wife Aeltje Boelens (1579–1620). They were also the nephews of poet P.C. Hooft. The painting is dated 7 April 1617, possibly the day the twins died. Painting portraits of deceased infants was customary in the 17th century.

Many intriguing themes are raised by the description of the twins. One in particular bears repeating: “The painting triggers the imagination of all observers and invites the clinician to exercise his observational and diagnos-

tic skills and interpret this tragic story.” The point is that inspection and judgment remain vital tools for physicians when generating difficult decisions with little information. Given the unforeseen complications that often accompany multiple births, the implications of this comment for delivering physicians are clear.

MZ at Last

My 1999 high school reunion reunited me with old friends and twins, Brenda and Julie S. We shared many memorable moments during those early years, partly because we all understood the significance of twinship in our educational and social lives. I am part of a DZ pair, and Betty and Jill also believed they were DZ twins — their mother had told them this was so and they often cited small differences between them. I always suspected otherwise. I raised my opinion with them

occasionally, always gently, but they remained adamant. Meeting again after so many years, Brenda and Julie were intrigued with my research on twins and eager to learn more. They also expressed interest in knowing their true twin type. Both had had several children whose unusual similarities, together with their own reassessment of their behavioral synchronies, eventually cast doubt on their belief in dizygosity. I guided them toward Affiliated Genetics, in Woods Cross, Utah where their DNA markers were compared. Laboratory results yielded a verdict of MZ. Betty e-mailed to say me that: “... we are indeed identical — it’s a nice, somewhat profound feeling.” Her words both touched and amused me — I had helped old friends confirm a fundamental feature about themselves, and I had known immediately what had taken them years to figure out. ■

References

- Allen, G. (1960). A differential method for estimation of type frequencies in triplets and quadruplets. *American Journal of Human Genetics*, 12, 210–224.
- Berger, H.M., de Waard, F., & Molenaar, Y. (2000). A case of twin-to-twin transfusion in 1617. *The Lancet*, 356, 847–848.
- Brotherly Love. (2000, November 20). *People Magazine*.
- Buchsbaum, M.S., Mirsky, A.F., DeLisi, L.E., Morihisa, J., Karson, C.N., Mendelson, W.B., King, A.C., Johnson, J., Kessler, R., et al., (1984). The Genain quadruplets: Electrophysiological positron emission, and X-ray tomographic studies. *Psychiatry Research*, 13, 95–108.
- DeLisi, L.E., Mirsky, A.F., Buchsbaum, M.S. van Kammen, D.P., Berman, K.F., Caton, C., Kafka, M.S., Ninan, P.T., Phelps, B.H., Karoum, F., et al., (1984). The Genain quadruplets 25 years later: A diagnostic and biochemical followup. *Psychiatry Research*, 13, 59–76.
- Docherty, N.M., & Gottesman, I.I. (2000). A twin study of communication disturbances in schizophrenia. *Journal of Nervous and Mental Disease*, 188, 395–401.
- Dornan, K., Saade, G.R., Smith, H., Moise Jr., K.J. (2000). Use of the World Wide Web in a multicenter trial of treatment for twin-twin transfusion syndrome. *Obstetrics and Gynecology*, 96, 636–639.
- Evening news. (2001, January 1).
- Girl Receives Arm From Twin (2000, October 16). *Reuters*.
- Gottesman, I.I. (1991). *Schizophrenia Genesis*. New York: WH Freeman & Co.
- Jonsson, E.G., Härnryd, C., Johannesson, T., Wahlstrom, J., Bergenius, J., Bergstedt, H., Greitz, D., Nyman, H., Bjorck, E., Blennow, E., & Sedvall, G.C. (1997). Further studies on a male triplet with schizophrenia: Cytogenetical and neurobiological assessments in the patients and their parents. *European Archives of Psychiatry and Clinical Neurosciences*, 247, 239–247.
- Jönsson, E.G., Mirsky, A.F., Johannesson, T., Wahlstrom, J., Bieliauskas, L.A., van Kammen, D.P., & Sedvall, G.C. (1997). No cytogenetic abnormalities in a set of schizophrenic quadruplets. [Letter]. *Biological Psychiatry*, 42, 1186–1187.
- Mirsky, A.F., Bieliauskas, L.A., French, L.M., Van Kammen, D.P., Jönsson, E., & Sedvall, G.A. (2000). 39-year followup of the Genain Quadruplets. *Schizophrenia Bulletin*, 26, 699–708.
- Mirsky, A.F., DeLisi, L.E., Buchsbaum, M.S. Quinn, O.W., Scherz, P., Siever, L.J., Mann, L., Weingarten, H., Zec, R., Sostek, A. et al., (1984). The Genain quadruplets: Psychological studies. *Psychiatry Research*, 13, 77–93.
- Mirsky, A.F., Ingraham, L.J., & Lowing, P.J. (1992). Childhood stress events and the development of schizophrenia. *Progress in Experimental Personality Research*, 15, 110–130.
- Mirsky, A.F., & Quinn, O.W. (1988). The Genain quadruplets. *Schizophrenia Bulletin*, 14, 595–612.
- Moran, M. (2000). Four Sisters With Schizophrenia. DNA.com (WebMD).
- Poole, O. (2000, October 29). Scientists Find Bras a Pain and a Possible Cancer Risk. *The Telegraph (London) on-line*.
- Rosenthal, D. (Ed). (1963). *The Genain Quadruplets: A Case Study and Theoretical Analysis of Heredity and Environment in Schizophrenia*. New York: Basic Books.
- Scammell, C. (2000, November). Wow, I’m Having 4 Babies. *Parents*, 223–226.
- Segal, N.L. (2000). *Entwined Lives: Twins and What They Tell Us About Human Behavior*. New York: Plume.
- The Jewish Journal* (2000, September 29). p. 59.
- Today Show*. (2000, December 7).
- Zhang, Y., Lawrance, S.K., Ryder, O.A., Zhang, Y., & Isaza, R. (2000). Identification of monozygotic twin chimpanzees by microsatellite analysis. *American Journal of Primatology*, 52, 101–106.