Historical Vignette

Ramstedt and the centennial of pyloromyotomy

In this year of 2012, we note a number of centennials with varying degrees of enthusiasm: the 100th anniversaries of the sinking of the Titanic in the North Atlantic, the ending of the Qing Dynasty in China, the misfire of the British expedition to the South Pole, and the first baseball game in Boston’s Fenway Park among others—including one of special significance to pediatric surgeons and the thousands of babies saved because of a discovery reported in a German journal 100 years ago. In this year, the pediatric surgical community will celebrate the 100th anniversary of Conrad Ramstedt’s report, “Zur Operation der angeborenen Pylorusstenose” [1], in the October 1912 issue of Medicinische Klinik (Fig. 1) in which he first describes the operation that Willis Potts called, “the most satisfactory procedure in the field of pediatric surgery” [3]. Indeed, there is probably no procedure in all of surgery that is more satisfying than the Ramstedt pyloromyotomy.

Only a few cases of infantile hypertrophic pyloric stenosis had been identified over the years before Harald Hirschsprung’s [4] report in 1888 of the clinical and pathologic findings in 2 of his own pediatric patients in Copenhagen. After Hirschsprung’s presentation, case reports of pyloric stenosis in infants became increasingly frequent, along with reports of medical and surgical efforts to cure this mysterious and lethal disease. By 1910, Ibrahim, a German pediatrician, counted 598 published cases, mostly in the German, British, and American literature (cited by Mack [5]). By the time Ramstedt described his operation for pyloric stenosis in 1912, the diagnostic criteria had been defined to include onset of projectile vomiting after a period of normal feeding for a few weeks postpartum, decreasing frequency of stools and urination, weight loss leading to inanition, and, variably, a palpable “tumour” in the upper abdomen.

In 1912, most physicians caring for infants were reluctant to turn infants with pyloric stenosis over to surgeons because of the poor results of operative treatment. Most babies were treated with dietary manipulation and referred urgently to a surgeon—if at all—only when death otherwise seemed inevitable. Some pediatricians would never refer a case to a surgeon because the results of operation were not demonstrably better than persisting with “medical” treatment until the little patient responded or died.

In the first paragraph of his historic article, Ramstedt deplores the failure of Kinderarzten to send their babies to surgeons in timely fashion, or at least before they lapse into an unfortunate wretched condition. On the other hand, he points out, it is the duty of the operator who takes this on to choose the operation that is simplest, least dangerous and that takes a minimum of time1 (Fig. 1.).

Ramstedt moves on to critique, by the numbers, operations that had already been tested in infants with pyloric stenosis to find the operation best suited to his criteria of simplicity, safety, and swiftness.

1. Ramstedt immediately dismisses a palliative jejunostomy as reported in a single case with fatal outcome by Cordua of Hamburg in 1892 [5]. The operation creates an unnatural condition, a fistula, and does not deal with the root of the problem.
2. Ramstedt goes on to reject pyloric resection that was reported once with an unfavorable outcome. It is much too intrusive and in my view it is technically not feasible.
3. Ramstedt then discusses the procedure credited to Loreta [6] of Bologna, who, in 1887, split, or “divulsed,” the stenosed adult pyloric muscle with a finger introduced through a gastrostomy; but he rejects that operation as well despite its being used successfully twice by the Scottish surgeon James Nicoll, who substituted an appropriate-sized instrument for a finger to divulse the pyloric muscle: although simple and fast, the procedure is bloody and “unchirurgisch.” Since the muscle isn’t completely divided, obstruction might recur necessitating a reoperation. Besides, as far as I [Ramstedt] know, there is no enthusiasm for the procedure in Germany. In 1906, Nicoll [7] reported a series of 6 operations in which he combined the Loreta procedure with a submucosal V-Y pyloroplasty with only 1 fatality and 5 cures. Ramstedt passed on that operation as well, admitting I don’t know if I could imitate Nicoll’s success.
4. Although widely promoted, especially by American surgeons, gastroenterostomy was considered by

---

1 I have used italics for passages directly translated from Ramstedt’s 1912 article. For those wondering why Ramstedt spelled his name differently in 1912, see [2].
Ramstedt to be too demanding an operation to do on a very sick infant. However, although it carried a high mortality rate, posterior gastroenterostomy remained the favored operation for infantile pyloric stenosis in those early days of the 20th century before the Ramstedt pyloromyotomy became the operation of choice.

5. Ramstedt rejected the pyloroplasty reported in adults by von Heineke and von Mikulicz-Radecki in 1886 and 1887, because of its high complication rate, especially because postoperative disruption of the transverse closure often resulted in peritoneal soiling, peritonitis, and, in most cases, death.

Because the high mortality after all the foregoing operations was so often caused by peritonitis after spillage of gastrointestinal contents into the abdomen of a tiny, sick baby, Ramstedt, in choosing an operation to do on his first case of pyloric stenosis in a baby, was attracted to a modification of pyloroplasty in a recent article by Wilhelm Weber [8], a Dresden surgeon, who, in 1910, reported 2 cases of pyloric stenosis in infants cured by a submucosal pyloroplasty that Ramstedt called a "Partielle Pyloroplastik" (partial pyloroplasty). This procedure eliminated the risk of peritonitis inherent in the Heineke-Mikulicz pyloroplasty even if the sutures holding the transverse closure pulled through. That Dufour and Fredet [9] had reported the same operation—submucosal pyloroplasty—and used it successfully in 2 infants with pyloric stenosis in 1907, 3 years before Weber's report, apparently escaped Ramstedt's notice.

On August 23, 1911, Ramstedt performed his first pyloric stenosis operation on a 7-week-old, firstborn son of a Westphalian nobleman. Ramstedt, for reasons explained above, planned to perform die Webersche Pyloroplastik.

After cutting through the hypertrophied, bloodless muscle, it occurred to me that the stenosis was relieved. But, despite that, I decided to complete the Webersche Pyloroplastik. The edges of the muscle were gaping and the sutures kept pulling through, so that I couldn't complete the transverse...
closure; therefore I fastened a patch of omentum over the exposed mucosa and closed. Although his little patient recovered, the postoperative course was stormy with 8 days of vomiting attributed by Ramstedt to the sutures he placed at the beginning of his attempted transverse closure. Ramstedt concluded from this case that division of the hypertrophied pyloric sphincter was all that was required to cure a baby with pyloric stenosis (That the mucosa could remain viable, unsupported, and without a tissue covering he knew at the time of his first case from the 1907 article of Dufour and Fredet describing a successful submucosal pyloroplasty in which Fredet was unable to cover a “lozenge” size gap in the transverse muscle closure. How Ramstedt knew this and failed to mention Fredet’s priority in describing submucosal pyloroplasty over Weber’s in his report is puzzling to me.) From his observations in this first case, Ramstedt vowed to omit the transverse muscle closure from his next case and simply split the muscle.

On June 18, 1912, Ramstedt performed the first pyloromyotomy on a 6-week-old son of a physician who had lost 2 other infant boys to complications of hypertrophic pyloric stenosis. This baby never vomited postoperatively and went home on his mother’s breast-feedings in 12 days.

In a lecture at the University of Lille on December 7, 1854, Louis Pasteur stated, “Dans les champs de l’observation le hazard ne favoris que les esprits prepares”, usually translated as “In the field of observation chance favors only the prepared mind.” How perfectly that comment by Pasteur characterizes Conrad Ramstedt’s realization, because of a chance mishap in his first case, that a simple myotomy would cure a baby with hypertrophic pyloric stenosis (Fig. 2)! In 2012, we celebrate the fruits of Ramstedt’s prepared mind that has saved the lives of countless infants over the past hundred years.

Acknowledgment

The author thanks John Raffensperger, MD and John Benfield, MD for their invaluable assistance.

Anthony Shaw, MD, FACS, FAAP
Emeritus Professor of Pediatric Surgery
University of California Los Angeles
1 South Orange Grove Blvd. #9
Pasadena, CA 91105
University of California Los Angeles Surgery
Pasadena, CA 91105, USA
E-mail address: shawpas@pacbell.net

References