

COMPREHENSIVE REPORT ON THE FIRST 20 ESOPHAGEAL ATRESIA PATIENTS TREATED WITH MAGNETIC COMPRESSION ANASTOMOSIS USING THE CONNECT EA™ SYSTEM

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Introduction:

Management of **long-gap and other forms of complex esophageal atresia (EA)** remains **a challenge**. **Magnetic compression anastomosis (MCA)** is an endoscopic procedure that has the potential of limiting the need for more invasive surgery. We developed **specially-shaped high-power magnets (connect EA™, Figure 1)** that have been shown to facilitate a **secure, reliable esophageal anastomosis** in preclinical studies. The connect EA™ MCA system was employed in a **large spectrum of patients with complicated EA under compassionate care ethics**. This report details our experience, including challenges, pitfalls, and outcomes.

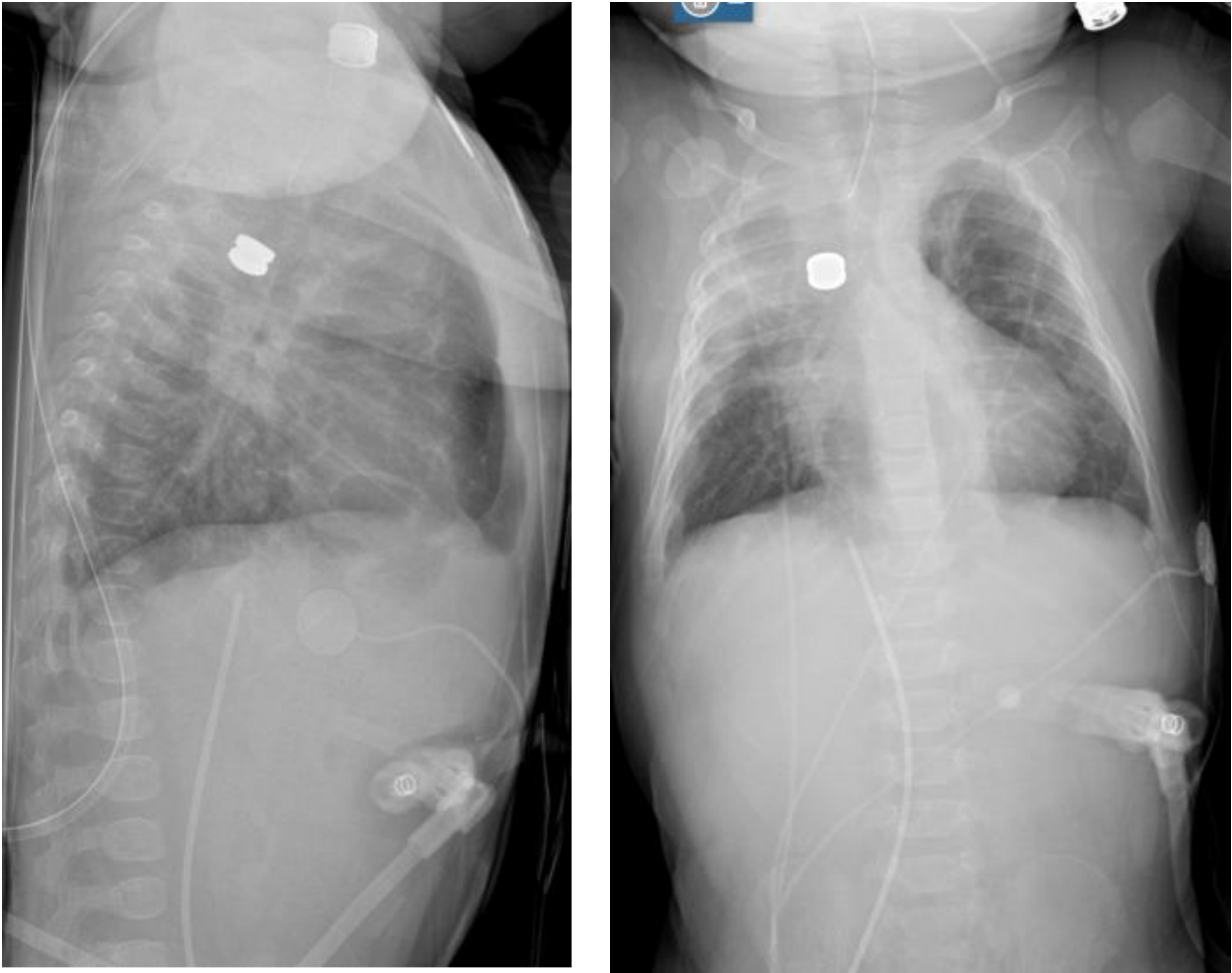


Figure 2: Radiographs of a patient with magnets in situ, lateral view on the left, anteroposterior view on the right. The upper magnet is placed endoscopically via the pharynx, the lower magnet is placed endoscopically via the gastrostomy. It usually takes about 8 to 12 days for the anastomosis to form. The magnets generally pass distally with peristalsis and are eliminated in the stool.

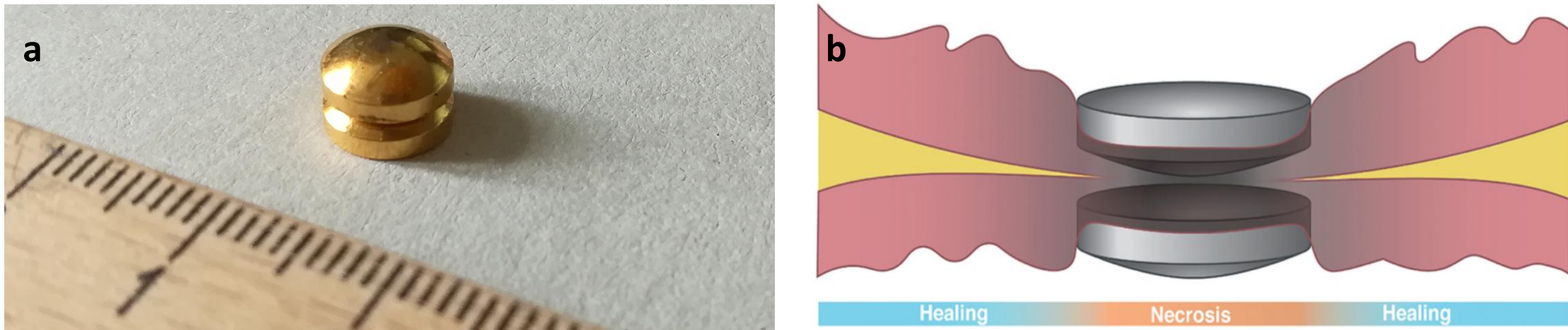


Figure 1: Close-up of connect EATM magnets (a) used in this patient series. The magnets are 8mm in diameter and have a bi-radial shape that facilitates high-powered central compression with a peripheral healing zone (b)

Methods:

A **retrospective review** of all patients in whom the connect EA™ System was employed with **the intention of creation of an esophageal MCA** in EA patients at our institutions was performed. Patient demographics, success in facilitating a patent MCA, intraoperative and postoperative parameters, subsequent interventions including dilatations, complications and outcomes were recorded and evaluated.

Results:

From 2019 through 2025, a total of **20 EA patients** were identified who had endoscopic intraluminal placement of the connect EA™ magnets (Table 1). All patients had **severe co-morbidities** that placed them at **higher risk for surgical repair** and prolonged general anesthesia. In this cohort, 16 interventions were successful and led to an esophageal anastomosis within 3 to 14 days after the procedure. In 4 cases, the magnets did not mate or separated in the first 24 hours after the procedure. These patients underwent conventional thoracoscopic (n=2) or open surgical (n=2) anastomosis. One MCA patient developed a recurrent tracheoesophageal fistula. Patients had between **3 and 12 dilatations** over a follow-up period of up to 6 years. None of the patients required stent placement or resection/anastomosis for stricture. Two patients developed leaks. All patients eventually established full oral nutrition.



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Patient	Sex (m/f)	EA type	GA birth (weeks)	Birth weight (grams)	Approximation (y/n)	MCA age (days)	Time to patency (postop days)	Closure gastrostomy (days) age	Dilatations (n)	Follow-up (years)
1	f	A	35	1830	y thoracoscopic	51	7	122	4	6
2	m	B	33	1980	y thoracoscopic	58	12	297	4	6
3	f	C	42	3700	y thoracoscopic	112	14	273	5	5
4	f	A	36	1965	y thoracoscopic	76	6	132	3	4
5	m	B	38	3210	y thoracoscopic	175	Unsuccessful	385	>15	4
6	m	C	36	2000	y open	138	Unsuccessful	270	3	4
7	m	C	40	3190	y open	27	14	124	5	4
8	f	C	34	1670	y open	203	8	455	11	3
9	m	A	38	2690	n	15	6	118	5	3
10	m	A	30	1600	y laparoscopic	156	4	540	7	3
11	f	A	37	1900	y thoracoscopic	34	7	320	12	3
12	m	C	26	850	y thoracoscopic	82	9	210	4	2
13	f	B	27	825	n	143	14	284	9	2
14	f	C	35	2020	y open	129	14	not closed	9	2
15	f	C	37	2530	y open	14	Unsuccessful	not closed	9	2
16	m	A			y thoracoscopic	39	9	125	9	<1
17	m	C			y open	36	14	not closed	7	<1
18	f	A			n	32	Unsuccessful	not closed	3	<1
19	f	C	32	1360	y open	143	10	not closed	3	<1
20	m	A			y thoracoscopic	102		not closed		<1
10 m		8 A	median	median 1980	15 y	median	median 9.5	median 273	median 5	median 3
10 f		3 B	36	[825-3210]	5 n	82	[4-14]	[125-540]	[3->15]	[<1-6]
		9 C	[26-42]							

Table 1: Overview of the included EA patients treated with MCA using the connect EA™ device (unsuccessful attempts grey) .

Conclusions:

- This report demonstrates that **MCA using the connect EATM system is feasible and safe with favorable outcomes in complex EA patients** with severe co-morbidities.
- The **complication profile is similar to the conventional technique**.
- In patients who may **not tolerate long operative and anesthesia times**, the **device offers considerable benefit** over conventional handsewn esophageal anastomosis.
- Future **prospective and comparative studies should be performed** to substantiate these findings.

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