

Outcomes Of Abdominal Wall Reconstruction Using Acellular Dermal Matrix In High-risk CDC Class III And IV Defects

Abbas M Hassan, MD; Malke Asaad, MD; Anaeze C Offodile II, MD, MPH, FACS; Charles E Butler, MD, FACS
Department of Plastic and Reconstructive Surgery, The University of Texas MD Anderson Cancer Center, Houston, TX.

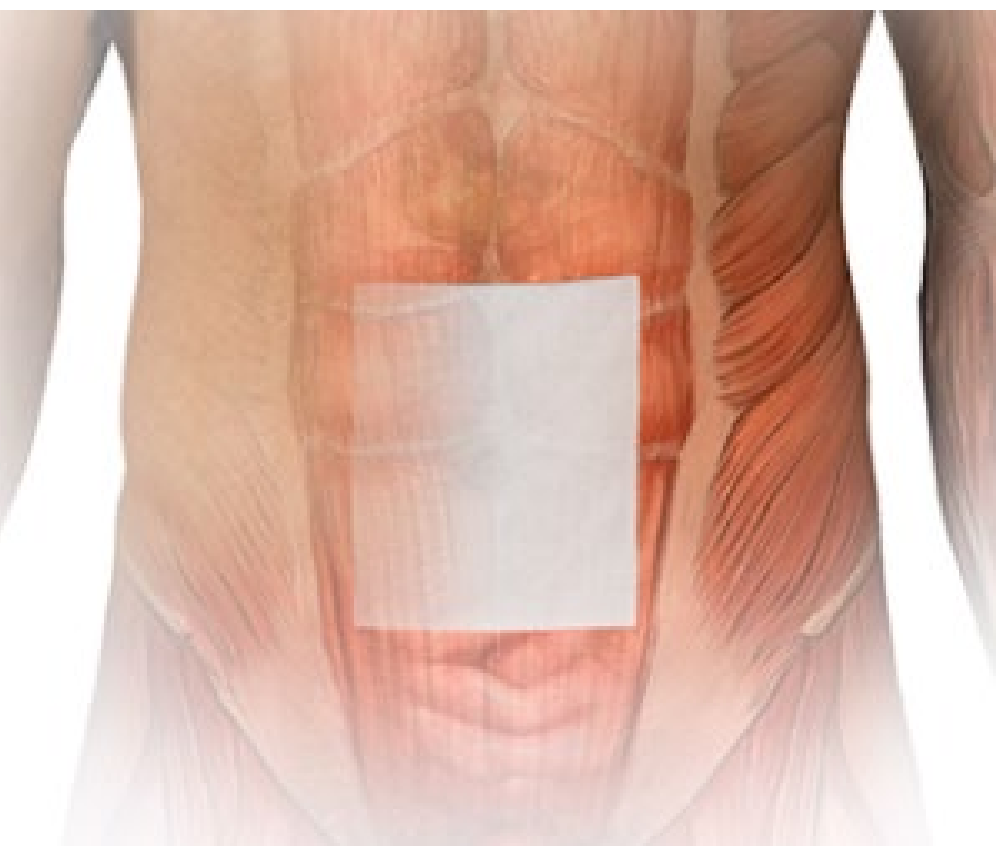


Background

- >400,000 operations performed annually in the US alone.
- Costs >\$3 billion
- AWR in the presence of bacterial contamination is challenging



Contamination Level



Acellular Dermal Matrix (ADM)

Rapid
revascularization

Cellular
infiltration

Soft tissue
incorporation

Fibroblast
stimulation

Knowledge gap

- Optimal mesh selection in class III/IV defects is controversial
- Outcomes using ADM are lacking

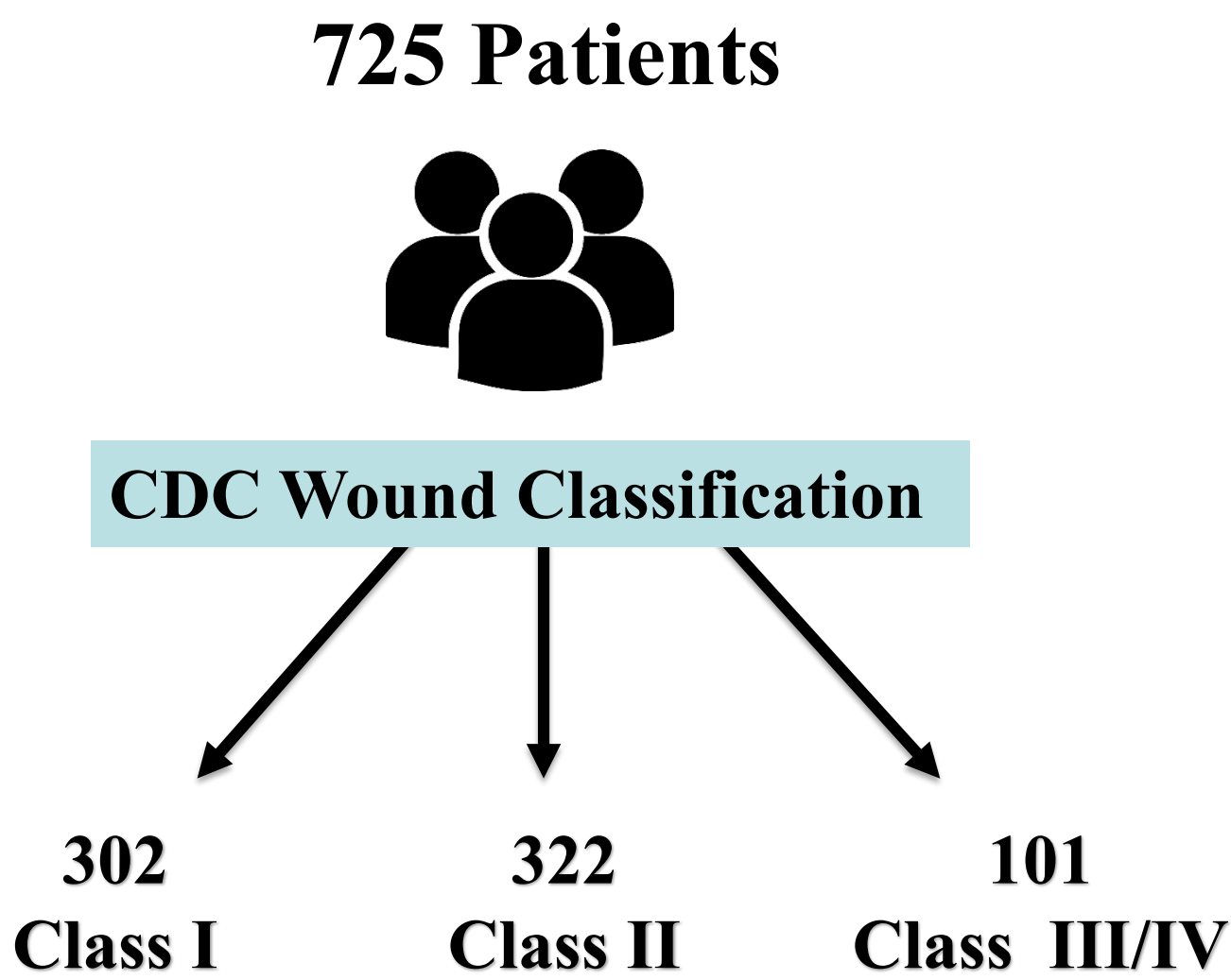
Objective

- Evaluate the long-term outcomes of AWR using Porcine ADM and bovine ADM in patients with CDC class III and IV defects

Methods

- Retrospective cohort study
- March 2005 to June 2019
- The University of Texas MD Anderson Cancer Center
- AWR of Class III and IV patients
- Primary outcome: Hernia recurrence (HR)
- Secondary outcomes: Surgical site occurrences (SSOs) and surgical site infections (SSIs)

Results



- Patients with class III/IV had HR rate of 21%, SSO rate of 49%, and SSI rate of 24
- Class IV defects were predictive of SSOs (odds ratio [OR], 2.88; 95% confidence interval [CI], 1.11–7.42; P = 0.029) but not HR (HR, 1.60; 95% CI, 0.59–4.34; P = 0.355) or SSIs (OR, 2.62; 95% CI, 0.85–8.10; P = 0.094).

TABLE 1. Patient Demographics				
Variable	All	CDC Class III	CDC Class IV	P
Patients, n (%)	101 (100)	68	33	
Age, y, mean ± SD	61.3 ± 11.1	61.3 ± 11.04	61.27 ± 11.49	0.968
Sex, n (%)				0.301
Female	41 (40.6)	30 (44.1)	11 (33.3)	
Male	60 (59.4)	38 (55.9)	22 (66.7)	
BMI, kg/m², mean ± SD	31.8 ± 7.3	32.37 ± 7.32	30.54 ± 7.3	0.291
BMI >30 kg/m², mean, n (%)	56 (55.4)	40 (58.8)	16 (48.5)	0.327
Tobacco use, n (%)	11 (10.9)	8 (11.8)	3 (9.1)	0.999
≥1 medical comorbidity, n (%)	78 (77.2)	52 (76.5)	26 (78.8)	0.795
Coronary artery disease	21 (20.8)	18 (26.5)	3 (9.1)	0.066
Diabetes mellitus	27 (26.7)	13 (19.1)	14 (42.4)	0.013
Hypertension	64 (63.4)	44 (64.7)	20 (60.6)	0.688
Pulmonary disease	12 (11.9)	10 (14.7)	2 (6.1)	0.328
Renal disease	15 (14.9)	13 (19.1)	2 (6.1)	0.134
Preoperative radiotherapy, n (%)	36 (35.6)	27 (39.7)	9 (27.3)	0.221
Postoperative radiotherapy, n (%)	8 (7.9)	7 (10.3)	1 (3)	0.268
Preoperative chemotherapy, n (%)	67 (66.3)	47 (69.1)	20 (60.6)	0.396
Intraoperative chemotherapy, n (%)	1 (1)	1 (1.5)	0 (0)	0.999
Postoperative chemotherapy, n (%)	18 (17.8)	7 (10.3)	11 (33.3)	0.005
ASA status, n (%)				0.803
1	0 (0)	0 (0)	0 (0)	
2	7 (6.9)	5 (7.4)	2 (6.1)	
3	76 (75.2)	50 (73.5)	26 (78.8)	
4	17 (16.8)	13 (19.1)	4 (12.1)	
3/4	93 (92.1)	63 (92.6)	30 (90.9)	0.999

TABLE 2. Surgical Outcomes				
Outcomes	All	CDC Class III	CDC Class IV	P
Patients, n (%)	101 (100)	68 (67)	33 (33)	
Hospitalization, d, mean ± SD	13.3 ± 12.8	13.15 ± 14.4	13.58 ± 8.78	0.246
Hernia recurrence, n (%)	21 (20.8)	15 (22.1)	6 (18.2)	0.815
SSI, n (%)	24 (23.8)	13 (19.1)	11 (33.3)	0.138
SSO, n (%)	49 (48.9)	28 (41.2)	21 (63.6)	0.034
Wound skin dehiscence, n (%)	23 (22.8)	17 (25)	6 (18.2)	0.443
Fat necrosis, n (%)	6 (5.9)	5 (7.4)	1 (3)	0.661
Cellulitis, n (%)	12 (11.9)	8 (11.8)	4 (12.1)	1.000
Wound abscess, n (%)	17 (16.8)	9 (13.2)	8 (24.2)	0.256
Hematoma, n (%)	2 (2)	2 (2.9)	0 (0)	1.000
Seroma, n (%)	10 (9.9)	6 (8.8)	4 (12.1)	0.725
Enterocutaneous fistula, n (%)	5 (5)	3 (4.4)	2 (6.1)	0.661
Mesh exposure, n (%)	5 (5)	2 (2.9)	3 (9.1)	0.327
Mesh removal, n (%)	5 (5)	2 (2.9)	3 (9.1)	0.595
Reoperation, n (%)	18 (17.8)	10 (14.7)	8 (24.2)	0.274
30-d readmission, n (%)	23 (22.8)	14 (20.6)	9 (27.3)	0.459
ICU stay, n (%)	8 (7.9)	2 (2.9)	6 (18.2)	0.014

TABLE 3. Multivariable Cox PH Model for HR		
	HR (95%CI)	p-value
Class IV defects	1.60 (0.59 - 4.34)	0.355
Multiple Logistic Regression Model for SSO		
	OR (95%CI)	p-value
Class IV defects	2.88 (1.11 - 7.42)	0.029
Multiple Logistic Regression Model for SSI		
	OR (95%CI)	p-value
Class IV defects	2.62 (0.85 - 8.10)	0.094

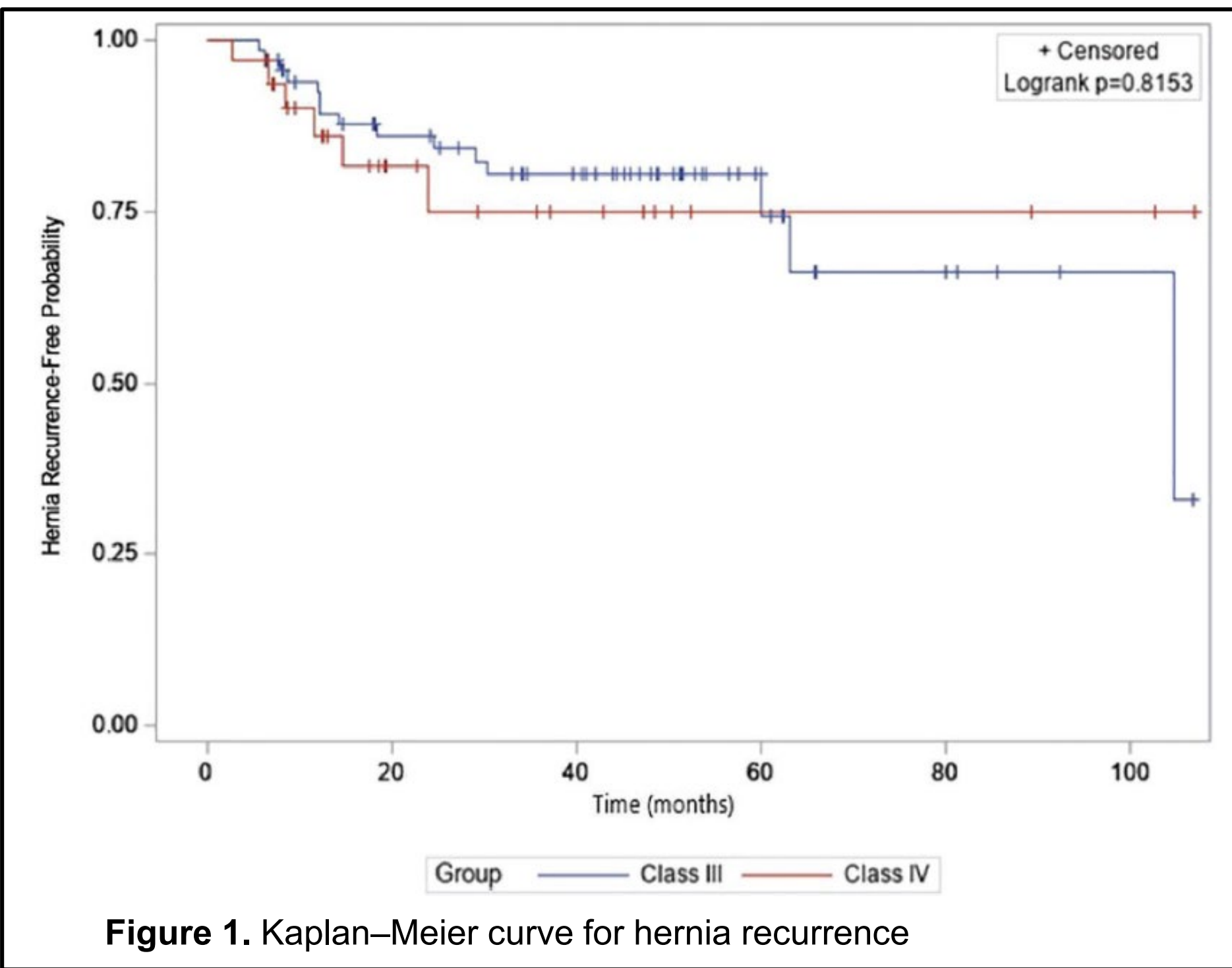


Figure 1. Kaplan–Meier curve for hernia recurrence

Limitations

- Single-institution retrospective design → confounding/bias
- Lack of synthetic mesh control
- No patient-reported outcomes
- Evaluated only the two most common ADMs

Conclusion

- Patients with class IV defects have a higher risk of SSOs, but not HR or SSIs
- Safe and durable long-term outcomes are achievable in single-stage AWR using xenogeneic mesh for CDC class III/IV defects despite the high level of defect contamination

References



Contacts for authors

