



Outcomes in Implant-Based Breast Reconstruction Utilizing Biosynthetic Mesh: A Meta-Analysis

Alisa Arnautovic MD, Sonya Williams BS, Makenna Ash BS, Ambika Menon MD, Orr Shauly, MD, Albert Losken MD



BACKGROUND

Biosynthetic mesh has become increasingly popular for immediate breast cancer implant-based reconstruction as an alternative to acellular dermal matrix for soft tissue support.

OBJECTIVE

To investigate the various biosynthetic mesh options available as well as complications and outcomes.

METHODS

PubMed (US National Library of Medicine, Bethesda, MD), MEDLINE (US National Library of Medicine), and Embase (Elsevier, Amsterdam, the Netherlands) were systematically reviewed for studies investigating TIGR (Novus Scientific, Uppsala, Sweden), Vicryl (Ethicon, Inc., Raritan, NJ), PDO (Integra LifeSciences, Princeton, NJ), TiLOOP (PFM Medical, Cologne, Germany), Durasorb (Integra LifeSciences, Princeton, NJ), and Galaflex (BD, Franklin Lakes, NJ) meshes, and their associated outcomes. The meta-analysis was completed in accordance with PRISMA guidelines and was performed to determine overall complication rates in patients who underwent breast reconstruction in which a mesh was used. Data were combined by a pooling of proportional outcomes as is inherent to meta-analysis. The heterogeneity of included studies was assessed in terms of Q and I^2 statistics.

RESULTS

A total of 24 studies investigating 6 different types of mesh in 2167 individual breasts undergoing implant reconstruction were included. Summary effect sizes were calculated for the complications. The pooled rate of seroma formation was 5.26% ($Q = 23.81\%$, $I^2 = 37.01\%$) reported in 13 studies, hematoma formation was 2.5% ($Q = 0.25\%$, $I^2 = 58.27\%$) reported in 9 studies, skin necrosis was 5.5% ($Q = 2.86\%$, $I^2 = 423.78\%$) reported in 10 studies, infection rate was 4.8% ($Q = 6.02\%$, $I^2 = 149.34\%$) in 21 studies, and implant loss was 3.85% ($Q = 6.55\%$, $I^2 = 129.07\%$) reported in 10 studies.

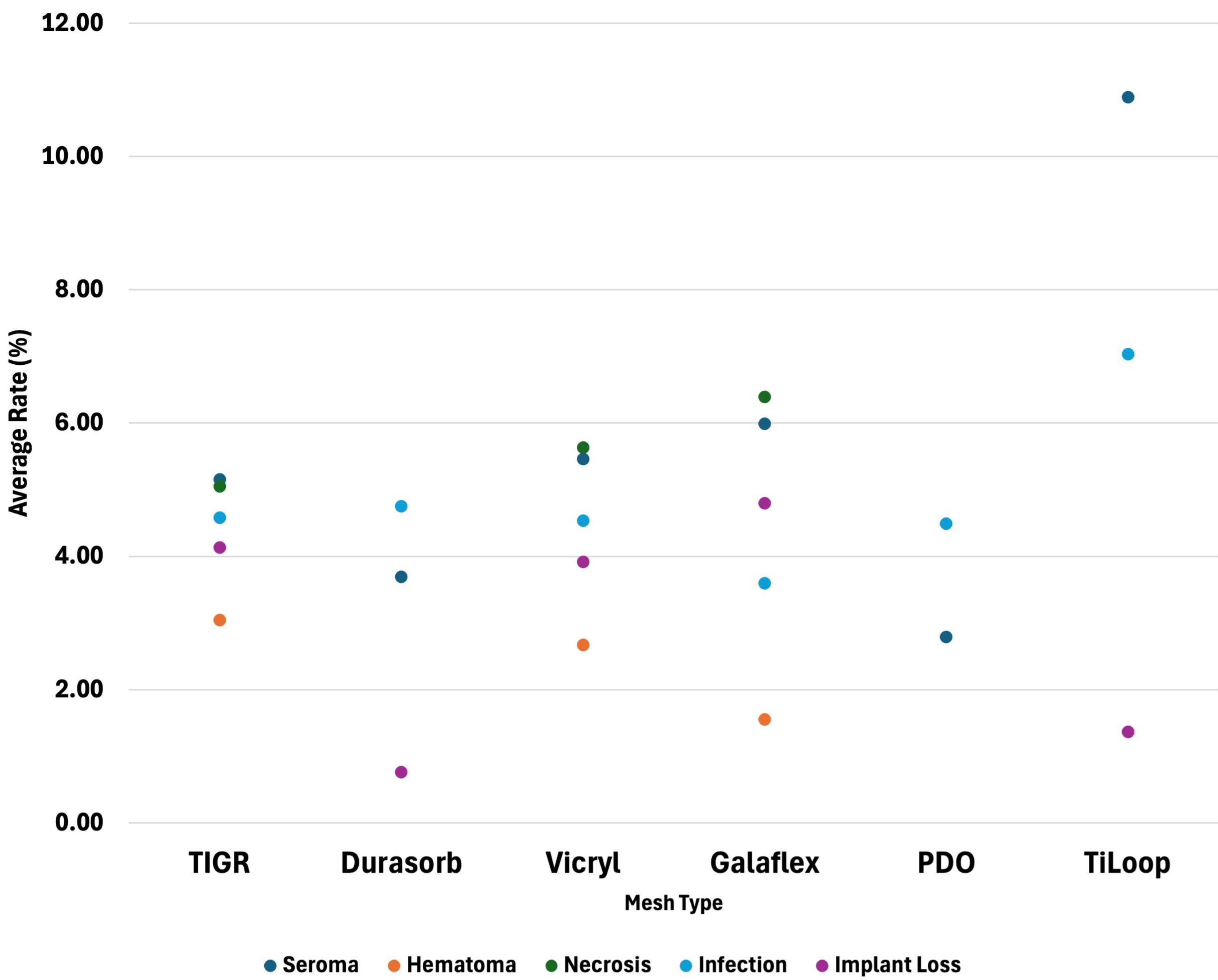


Figure 1. Pooled Complications Across Mesh Type

Author	Study type	Mesh type ^a	Number of breasts	Implant loss	Infection	Skin necrosis	Hematoma	Seroma
Becker and Lind ¹⁹	Retrospective review	TIGR	112	2	4	NR	NR	2
Hallberg et al ²⁰	Prospective review	TIGR	65	2	1	NR	1	2
Karoobi et al ²¹	Retrospective cohort	TIGR	106	4	5	7	1	4
Paganini et al ²²	RCT	TIGR	42	1	NR	NR	NR	NR
Pompei et al ²³	Retrospective review	TIGR	60	NR	1	3	4	2
Quinn et al ²⁴	Retrospective review	TIGR	164	11	9	5	0	NR
Sharma et al ²⁵	Retrospective review	TIGR	74	5	8	NR	0	0
Wow et al ²⁶	Retrospective review	TIGR	232	19	10	13	NR	32
Turin and Gutowski ²⁷	Prospective case series	Durasorb	27	0	0	NR	NR	1
Ganz et al ²⁸	Retrospective review	Vicryl	115	NR	3	9	1	NR
Gunnarsson and Thomsen ²⁹	Retrospective review	Vicryl	47	NR	1	NR	2	NR
Hashimoto et al ³⁰	Retrospective review	Vicryl	81	NR	5	7	1	1
Haynes and Kreithen ⁶	Prospective review	Vicryl	46	3	3	2	0	1
Karp and Salibian ³¹	Retrospective review	Vicryl	21	0	1	1	NR	NR
Kobraei et al ³²	Retrospective review	Vicryl	23	NR	1	NR	1	3
Mookerjee et al ³³	Retrospective review	Vicryl	23	NR	2	1	1	0
Tessler et al ⁹	Retrospective review	Vicryl	76	1	1	2	0	0
Sigalove et al ³⁴	Retrospective review	Galaflex	250	12	9	16	NR	15
Chiemi and Kelishadi ³⁵	Case series	PDO	105	NR	2	NR	NR	2
Qiu and Seth ³⁶	Prospective case series and description of technique	PDO	14	NR	1	NR	NR	NR
Turin and Gutowski ²⁷	Prospective case series	PDO	27	NR	NR	NR	NR	1
Casella et al ³⁷	Prospective case series	TiLOOP	73	1	2	NR	1	NR
Eichler et al ³⁸	Retrospective review	TiLOOP	192	NR	9	NR	NR	21
Gentile et al ³⁹	Retrospective case control	TiLOOP	192	NR	24	NR	3	NR

Table 1. Summary of Complications and Outcomes of the 24 Included Studies

CONCLUSION

Overall, although differences in mesh characteristics exist, the reported rate of complications is low. Biosynthetic mesh options should be taken into consideration in breast reconstruction given their demonstrated safety, significant cost advantage, and potential decrease in short-term complications in comparison to acellular dermal matrix.