Predictive Skin Testing and Allergic Reactions to Patent Blue in Breast Cancer Surgery

Maiko Smith

Breast and General Surgeon

Waikato Hospital

Co investigators:
Tahlia Kerridge
Rachel Shirley
Melissa Edwards
Lou Hayes
Jane Creighton
Adam Stewart
Ian Campbell

Background

- In early breast cancer, axillary staging is performed with sentinel lymph node (SLN) based approach.
- Dual tracer technique with Patent Blue V Dye (PBD) and radionucleotide injection is the current gold standard.

Background

- PBD is associated with allergic events.
  - Mild cutaneous to anaphylaxis.
  - First described in 1966.

Previously reported allergy rates

Year	Author	Population	Minor allergy (%)	Anaphylaxis (%)	Overall allergy rate (%)
1971	Mortazavi et al.	120	-	-	2.5
1975	Castellino et al.	659	0.6	0.15	0.75
2005	Beenen et al.	371	0.8	0.2	1.0
2010	Hunting et al.	1,418	0.15	0.35	0.5
2010	Barthelmes et al.	7,917	0.3	0.6	0.9
2010	Lucas et al.	732	-	-	0.55
2013	Elmadahm et al.	1,077	-	-	0.3

Background

- Predictive skin testing proposed to better predict anaphylaxis to PBD.

Aim

- Quantify accurate local allergy rates with particular focus on anaphylaxis to PBD during SLNB.
- Establish whether predictive skin-prick testing reduces rates of anaphylaxis to BPD.

Methods

- Patients were identified from the Waikato Breast Cancer Register
- All registered women who underwent SLNB from 1/1/1999 – 31/12/2016.

Methods

- Predictive skin testing data and allergic reactions were recorded at the time of the operation.
- Incidence of anaphylaxis cross-checked with Waikato Hospital allergy clinic notes to confirm PBD was the causal agent.

Skin testing

Results

- 1774 patients identified
- 851 patients had patent blue dye administered
- 16 cases of allergic reaction to patent blue dye
  - 7 anaphylaxis
  - 9 minor allergic reaction

Results

CASES	AGE	SKIN TEST DONE	REACTION TO PBD	GRADE OF REACTION	COMPLETED OPERATION	OUTCOME
CASE 1	61	Yes	Cardiorespiratory compromise and cutaneous reaction	III	Y	N/A
CASE 2	57	Yes	Hypotension, bradycardia and cutaneous reaction	III	Y	Extended hospital stay
CASE 3	71	Yes	Hypotension, angioedema, blue urticaria and erythema	III	Y	ICU admission and extended hospital stay
CASE 4	71	Yes	Persistent Hypotension	III	Y	ICU admission and extended hospital stay
CASE 5	54	Yes	Hypotension and cutaneous reaction	III	Y	Extended hospital stay
CASE 6	56	Yes	Hypotension and cutaneous reaction	III	Y	N/A
CASE 7	36	No	Persistent hypotension and cutaneous reaction	III	N	Operation abandoned, ICU admission

Results

	Overall (n=1774)	Skin testing (n=607)	No skin testing (n=1167)
Received PBD	851	587	264
No PBD	923	20	903
Anaphylaxis	7 (0.82%)	6 (1.02%)	1 (0.49%)
Minor reaction	9	4	5

Results

- 13 patients had positive skin test results and did not receive PBD

Conclusion & discussion

Anaphylaxis rate

- Waikato's anaphylaxis rate of 0.82%, higher than previously reported rates
  - 1 in 122 administrations
- Significant morbidity associated with anaphylactic reaction
  - 3 patients required ICU admission
  - 2 patients had their operations abandoned

Comparisons

- PBD anaphylaxis rate: 1 in 122
- Neuromuscular blocking agents : 1 in 6500
- Anaesthetic procedures overall: 1 in 10,000 – 20,000

Selective use?

- Selective use of patent blue dye.
  - Need careful patient selection.
  - Not used in cases with predictably high false negative rate.

Utility of skin testing

- No difference in anaphylaxis rate in skin tested and non-skin tested group.
- 6 patients who had anaphylaxis tested negative on skin test.
  - Negative test does not exclude the possibility of future anaphylactic reaction.
- 13 patients with positive skin test did not receive PBD.
  - These patients may potentially have been spared from anaphylaxis.
  - Getting positive result does not necessarily mean they will get anaphylaxis.

- Need to be wary of PBD use
  - High observed local rates, 1 in 122 administrations
- Skin test may not be helpful in preventing anaphylaxis
- ?Consider alternative technique