Cochrane
Library

Cochrane Database of Systematic Reviews

Abdominal decompression for suspected fetal compromise/pre-eclampsia (Review)

Hofmeyr GJ

Hofmeyr GJ.
Abdominal decompression for suspected fetal compromise/pre-eclampsia.
Cochrane Database of Systematic Reviews 2012, Issue 6. Art. No.: CD000004.
DOI: [10.1002/14651858.CD000004.pub2](https://doi.org/10.1002/14651858.CD000004.pub2).

www.cochranelibrary.com

TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	3
OBJECTIVES	3
METHODS	3
RESULTS	3
DISCUSSION	4
AUTHORS' CONCLUSIONS	4
ACKNOWLEDGEMENTS	4
REFERENCES	5
CHARACTERISTICS OF STUDIES	5
DATA AND ANALYSES	7
Analysis 1.1. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 1 Unchanged or worsening pre-eclampsia.	7
Analysis 1.2. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 2 Induction of labour (all indications).	7
Analysis 1.3. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 3 Induction for placental insufficiency.	8
Analysis 1.4. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 4 Fetal distress in labour.	8
Analysis 1.5. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 5 Low birthweight.	8
Analysis 1.6. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 6 Apgar score <6 at 1 minute.	9
Analysis 1.7. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 7 Perinatal mortality.	9
Analysis 1.8. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 8 Urinary oestriol increase mg per week.	9
Analysis 1.9. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 9 Fetal biparietal diameter increase mm per week.	10
Analysis 1.10. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 10 Birthweight.	10
WHAT'S NEW	10
HISTORY	10
CONTRIBUTIONS OF AUTHORS	10
DECLARATIONS OF INTEREST	10
SOURCES OF SUPPORT	11
INDEX TERMS	11

[Intervention Review]

Abdominal decompression for suspected fetal compromise/pre-eclampsia

G Justus Hofmeyr¹

¹Department of Obstetrics and Gynaecology, East London Hospital Complex, University of the Witwatersrand, University of Fort Hare, Eastern Cape Department of Health, East London, South Africa

Contact address: G Justus Hofmeyr, Department of Obstetrics and Gynaecology, East London Hospital Complex, University of the Witwatersrand, University of Fort Hare, Eastern Cape Department of Health, Frere and Cecilia Makiwane Hospitals, Private Bag X 9047, East London, Eastern Cape, 5200, South Africa. justhof@gmail.com.

Editorial group: Cochrane Pregnancy and Childbirth Group.

Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 6, 2012.

Citation: Hofmeyr GJ. Abdominal decompression for suspected fetal compromise/pre-eclampsia. *Cochrane Database of Systematic Reviews* 2012, Issue 6. Art. No.: CD000004. DOI: [10.1002/14651858.CD000004.pub2](https://doi.org/10.1002/14651858.CD000004.pub2).

Copyright © 2012 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Abdominal decompression was developed as a means of pain relief during labour. It has also been used for complications of pregnancy, and in healthy pregnant women in an attempt to improve fetal wellbeing and intellectual development.

Objectives

The objective of this review was to assess the effects of antenatal abdominal decompression for maternal hypertension or impaired fetal growth, on perinatal outcome.

Search methods

The Cochrane Pregnancy and Childbirth Group's Trials Register (2 February 2012).

Selection criteria

Randomised or quasi-randomised trials comparing abdominal decompression with no decompression in women with pre-eclampsia and/or fetuses thought to be compromised.

Data collection and analysis

Eligibility and trial quality were assessed by one review author.

Main results

Three studies were included, all with the possibility of containing serious bias. Therapeutic abdominal decompression was associated with the following reductions: persistent pre-eclampsia (relative risk 0.36, 95% confidence interval 0.18 to 0.72); fetal distress in labour (relative risk 0.37, 95% confidence interval 0.19 to 0.71); low birthweight (relative risk 0.50, 95% confidence interval 0.40 to 0.63); Apgar scores less than six at one minute (relative risk 0.26, 95% confidence interval 0.12 to 0.56); and perinatal mortality (relative risk 0.39, 95% confidence interval 0.22 to 0.71).

Authors' conclusions

Due to the methodological limitations of the studies, the effects of therapeutic abdominal decompression are not clear. The apparent improvements in birthweight and perinatal mortality warrant further evaluation of abdominal decompression where there is impaired fetal growth and possibly for women with pre-eclampsia.

PLAIN LANGUAGE SUMMARY

Antenatal abdominal decompression for maternal hypertension or impaired fetal growth

Abdominal decompression was first used to increase blood flow and the forward movement of the uterus during labour contractions as a way of relieving pain. A rigid covered dome is placed about the abdomen and the space around the abdomen is decompressed to -50 to -100 mm Hg for 15 to 30 seconds out of each minute for 30 minutes once to thrice daily, or continuously during labour. Observations that fetal wellbeing appeared to be improved led to its investigation for complications of pregnancy.

Three randomised controlled studies with a total of 356 pregnant women were identified from a search of the medical literature, all with the possibility of containing serious methodological limitations. The studies were reported on between 1967 and 1973. One study involved women with pre-eclampsia, essential hypertension, or chronic nephritis. The other two trials assigned women carrying babies that were small for their gestational age to abdominal decompression or no decompression.

Abdominal decompression appeared to have a beneficial effect on the progression of pre-eclampsia. This one trial also reported less fetal distress during labour and fewer low 1-minute Apgar scores in the group who received abdominal decompression. The apparent large improvement in birthweight and perinatal deaths reported in all three studies is sufficiently striking to warrant the further evaluation of abdominal decompression in cases of impaired fetal growth, and possibly for women with pre-eclampsia, by means of methodologically sound controlled trials. Because of the methodological shortcomings mentioned above, clinical use of abdominal decompression cannot be supported on the basis of the present trials.

BACKGROUND

Abdominal decompression was developed initially as a method of enhancing the forward movement of the uterus during labour contractions with a view to relieving pain. Unanticipated apparent beneficial effects on fetal condition led to its investigation for this purpose. A rigid dome is placed about the abdomen and covered with an airtight suit. The space around the abdomen is decompressed to -50 to -100 mmHg for 15-30 seconds out of each minute for 30 minutes once to thrice daily, or continuously during labour. This is thought to 'pump' blood through the intervillous space. See also [Hofmeyr 1989](#).

OBJECTIVES

To assess the effects on fetal growth and perinatal morbidity and mortality of abdominal decompression for the treatment of fetal compromise.

METHODS

Criteria for considering studies for this review

Types of studies

Clinical trials comparing the effect of therapeutic abdominal decompression on clinically meaningful outcomes, with a control group (no decompression); random or quasi-random allocation to the treatment and control group; violations of allocated management not sufficient to materially affect outcomes.

Types of participants

Women with pre-eclampsia and/or fetuses that were thought to be compromised.

Types of interventions

Antenatal abdominal decompression.

Types of outcome measures

Maternal blood pressure and proteinuria, morbidity and perinatal outcome.

Outcomes included if clinically meaningful; reasonable measures taken to minimise observer bias; missing data insufficient to materially influence conclusions; data available for analysis according to original allocation, irrespective of protocol violations; data available in format suitable for analysis.

Search methods for identification of studies

Electronic searches

The Cochrane Pregnancy and Childbirth Group's Trials Register was searched by the Trials Search Co-ordinator (2 February 2012).

The Cochrane Pregnancy and Childbirth Group's Trials Register is maintained by the Trials Search Co-ordinator and contains trials identified from:

1. quarterly searches of the Cochrane Central Register of Controlled Trials (CENTRAL);
2. weekly searches of MEDLINE;
3. weekly searches of EMBASE;

4. handsearches of 30 journals and the proceedings of major conferences;
5. weekly current awareness alerts for a further 44 journals plus monthly BioMed Central email alerts.

Details of the search strategies for CENTRAL, MEDLINE and EMBASE, the list of handsearched journals and conference proceedings, and the list of journals reviewed via the current awareness service can be found in the 'Specialized Register' section within the editorial information about the [Cochrane Pregnancy and Childbirth Group](#).

Trials identified through the searching activities described above are each assigned to a review topic (or topics). The Trials Search Co-ordinator searches the register for each review using the topic list rather than keywords.

No language restrictions were applied.

Data collection and analysis

Trials under consideration were evaluated for methodological quality and appropriateness for inclusion according to the prestated selection criteria, without consideration of their results. Individual outcome data were included in the analysis if they met the prestated criteria in 'Types of outcome measures'. Included trial data were processed as described in [Clarke 1999](#).

Data were extracted from the sources and entered onto the Review Manager computer software ([RevMan 1999](#)), checked for accuracy, and analysed as above using the RevMan software. For dichotomous data, relative risks and 95% confidence intervals were calculated, and in the absence of heterogeneity, results were pooled using a fixed effects model. Continuous data were pooled using weighted mean differences and 95% confidence intervals.

RESULTS

Description of studies

See [Characteristics of included studies](#).

Risk of bias in included studies

See [Characteristics of included studies](#), particularly the 'Methods' and 'Notes' sections.

One study ([Blecher 1967](#)) does not exclude the possibility of selection and observer bias. Allocation of 160 women with pre-eclampsia, essential hypertension or chronic nephritis to study and control groups was by alternation. Observers were not blind to the allocation of each woman, and the assessment of outcome as 'unchanged' or 'worsening' pre-eclampsia is somewhat subjective.

[MacRae 1971](#) do not define their method of selecting 'at random' 28 women with fetuses estimated to be small for gestational age and with urinary oestriol levels below the normal range, for abdominal decompression, and 28 to serve as controls.

[Varma 1973](#) allocated 140 women with clinically 'small for dates' fetuses and biparietal diameters below the 10th percentile by alternation to decompression and control groups. The allocation of seven women from each group was changed because of non-acceptance of abdominal decompression. It has not been possible to reanalyse the data according to the original constitution of the groups. The observers were not blind to the allocation of each

woman, and certain of the measures of outcome were to some extent subjective.

Interpretation of the results of these studies must be guarded because of the possibility of selection, observer and analysis bias outlined above.

Effects of interventions

In the trial reported by [Blecher 1967](#), abdominal decompression appeared to have a beneficial effect on the progression of pre-eclampsia. In both of the other trials ([MacRae 1971](#); [Varma 1973](#)), abdominal decompression appeared to be associated with a significantly greater increase in levels of urinary oestriol, although only [Varma 1973](#) actually presented data (1.68 [1.21] versus 0.91 [0.74] mg per week, mean values [SD]). In addition, [Varma 1973](#) found that abdominal decompression was associated with statistically significant faster weekly growth in the fetal biparietal diameter (2.08 [0.36] versus 1.49 [0.71] mm per week, mean values [SD]). [Blecher 1967](#) did not report a reduction in the incidence of induction of labour, while [Varma 1973](#) showed a trend to fewer inductions of labour in the decompression group, the more so for inductions for 'placental insufficiency'. [Varma 1973](#) also reported significantly less fetal distress during labour and depressed 1-minute Apgar scores in the group who had received abdominal decompression.

Observer bias and possibly reporting bias may account for some or all of the putative effects of abdominal decompression noted above. The assessment of birthweight is less susceptible to observer bias, and data are available from all three trials.

Abdominal decompression was associated with a substantial reduction in the incidence of low birthweight in two of the trials and an increase in mean birthweight and placental weight in the third ([MacRae 1971](#)). Perinatal mortality was also reduced in all three trials.

DISCUSSION

For outcomes assessed in more than one study, all results are compatible.

AUTHORS' CONCLUSIONS

Implications for practice

Because of the methodological shortcomings mentioned above, clinical use of abdominal decompression cannot be supported on the basis of these trials.

Implications for research

The large improvement in birthweight and perinatal mortality reported in all three studies is sufficiently striking to warrant the further evaluation of abdominal decompression in cases of impaired fetal growth, and possibly pre-eclampsia, by means of methodologically sound controlled trials.

ACKNOWLEDGEMENTS

Thanks to Elizabeth Whiteley for help translating the [Coppola 1985](#) paper.

REFERENCES

References to studies included in this review

Blecher 1967 {published data only}

Blecher JA. Aspects of the physiology of decompression and its usage in the toxæmias of pregnancy and in fetal distress in labour [MD thesis]. South Africa: University of the Witwatersrand, 1967.

MacRae 1971 {published data only}

MacRae DJ, Mohamedally SM, Willmott MP. Clinical and endocrinological aspects of dysmaturity and the use of intermittent abdominal decompression in pregnancy. *Journal of Obstetrics and Gynaecology of the British Commonwealth* 1971;**78**:636-41.

Varma 1973 {published data only}

Varma TR, Curzen P. The effects of abdominal decompression on pregnancy complicated by the small-for-dates fetus. *Journal of Obstetrics and Gynaecology of the British Commonwealth* 1973;**80**:1086-94.

References to studies excluded from this review

Coppola 1985 {published data only}

Coppola F, Battioni M, Vessichelli R, Daoh KS, Bacchi-Modena A. Auxologic results of abdominal decompression in growth disorders of the fetus. *Minerva Ginecologica* 1985; Vol. 37, issue 11:645-52. [CN-00279572]

Additional references

Clarke 1999

Clarke M, Oxman AD, editors. *Cochrane Reviewers' Handbook* 4.0 [updated July 1999]. In: Review Manager (RevMan) [Computer program]. Version 4.0. Oxford, England: The Cochrane Collaboration, 1999.

Hofmeyr 1989

Hofmeyr GJ. Abdominal decompression during pregnancy. In: Chalmers I, Enkin MW, Keirse MJNC editor(s). *Effective Care in Pregnancy and Childbirth*. Oxford: Oxford University Press, 1989:647-652.

RevMan 1999 [Computer program]

Update Software. Review Manager (RevMan). Version 4.0. Oxford, England: Update Software, 1999.

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Blecher 1967

Methods	Alternation.
Participants	Women with pre-eclampsia, essential hypertension or chronic nephritis.
Interventions	Women who received abdominal decompression compared with control group.
Outcomes	"Unchanged or worsening pre-eclampsia"; induction of labour; low birthweight; perinatal mortality.
Notes	Assessment of pre-eclampsia as "unchanged" or "worsening" somewhat subjective.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	High risk	Inadequate

MacRae 1971

Methods	Selected "at random", method not specified.
Participants	Women with fetuses estimated to be small for gestational age and urinary oestriol levels below the normal range.

Abdominal decompression for suspected fetal compromise/pre-eclampsia (Review)

Copyright © 2012 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

MacRae 1971 (Continued)

Interventions	Participants were allocated either to receive repeated abdominal decompression, or to act as controls.
Outcomes	Urinary oestriol levels; perinatal mortality.
Notes	Reported significantly greater urinary oestriol increase with abdominal decompression, but data not given.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	High risk	Inadequate

Varma 1973

Methods	Alternation. Allocation of 7 women from each group changed because of non-acceptance of abdominal decompression.
Participants	Women with clinically "small for dates" fetuses and biparietal diameters below the 10th percentile.
Interventions	Women who received abdominal decompression compared with control group.
Outcomes	Induction of labour; induction of labour for placental insufficiency; fetal distress in labour; low birth-weight; Apgar score <6 at 1 minute; perinatal mortality; urinary oestriol increase (mean 1.68 mg per week [sd 1.21] versus 0.91 [0.74]; weekly growth in fetal biparietal diameter (2.08 [0.36] versus 1.49 [0.71])
Notes	Use of reduced biparietal diameter as a selection criterion may have resulted in the inclusion of women with incorrect dates rather than growth impairment.

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	High risk	Inadequate

Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
Coppola 1985	Allocation was not stated to be randomized or quasi-randomized. Women with fetal growth impairment at 32 to 34 weeks' gestation were divided into 2 groups. Fourteen women received abdominal decompression to -50 to -70mmhg for 15-30 second per minute for 30 minutes, twice a week. Twelve women acted as controls (bedrest). There appeared to be improved growth in the decompression group.

DATA AND ANALYSES

Comparison 1. Abdominal decompression for suspected fetal compromise/pre-eclampsia

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Unchanged or worsening pre-eclampsia	1	80	Risk Ratio (M-H, Fixed, 95% CI)	0.36 [0.18, 0.72]
2 Induction of labour (all indications)	2	300	Risk Ratio (M-H, Fixed, 95% CI)	0.97 [0.75, 1.25]
3 Induction for placental insufficiency	1	140	Risk Ratio (M-H, Fixed, 95% CI)	0.74 [0.46, 1.19]
4 Fetal distress in labour	1	140	Risk Ratio (M-H, Fixed, 95% CI)	0.37 [0.19, 0.71]
5 Low birthweight	2	304	Risk Ratio (M-H, Fixed, 95% CI)	0.50 [0.40, 0.63]
6 Apgar score <6 at 1 minute	1	140	Risk Ratio (M-H, Fixed, 95% CI)	0.26 [0.12, 0.56]
7 Perinatal mortality	3	367	Risk Ratio (M-H, Fixed, 95% CI)	0.39 [0.22, 0.71]
8 Urinary oestriol increase mg per week	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
9 Fetal biparietal diameter increase mm per week	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
10 Birthweight	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Analysis 1.1. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 1 Unchanged or worsening pre-eclampsia.

Analysis 1.2. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 2 Induction of labour (all indications).

Analysis 1.3. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 3 Induction for placental insufficiency.

Analysis 1.4. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 4 Fetal distress in labour.

Analysis 1.5. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 5 Low birthweight.

Analysis 1.6. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 6 Apgar score <6 at 1 minute.

Analysis 1.7. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 7 Perinatal mortality.

Analysis 1.8. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 8 Urinary oestriol increase mg per week.

Analysis 1.9. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 9 Fetal biparietal diameter increase mm per week.

Study or subgroup	Treatment		Control		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
Varma 1973	70	2.1 (0.4)	70	1.5 (0.7)	+	0.59[0.4,0.78]

Analysis 1.10. Comparison 1 Abdominal decompression for suspected fetal compromise/pre-eclampsia, Outcome 10 Birthweight.

Study or subgroup	Treatment		Control		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
MacRae 1971	28	2800 (591)	28	2296 (364)		504[246.91,761.09]

WHAT'S NEW

Date	Event	Description
2 February 2012	New citation required but conclusions have not changed	Review updated.
2 February 2012	New search has been performed	Search updated. No new trials identified.

HISTORY

Protocol first published: Issue 2, 1996

Review first published: Issue 2, 1996

Date	Event	Description
2 July 2010	Amended	Contact details edited.
29 October 2008	New search has been performed	Search updated. One new trial excluded (Coppola 1985).
16 October 2008	Amended	Converted to new review format and a plain language summary added.
25 October 2004	New search has been performed	Search updated. No new trials identified.

CONTRIBUTIONS OF AUTHORS

GJH prepared and maintains the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- University of the Witwatersrand, South Africa.

External sources

- South African Medical Research Council, South Africa.
- The Nuffield Trust, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

Estriol [blood]; Fetal Development; Fetal Diseases [*prevention & control]; Fetal Distress [therapy]; Lower Body Negative Pressure [*methods]; Pre-Eclampsia [*prevention & control]; Pregnancy Outcome; Randomized Controlled Trials as Topic

MeSH check words

Female; Humans; Pregnancy