

## CONSTRICTION-RING DYSTOCIA\*

JAMES T. LOUW, CH.M., F.R.C.O.G.

*Professor of Obstetrics and Gynaecology, University of Cape Town*

With the advent of organized antenatal care and modern methods of combating sepsis, shock and haemorrhage, obstetrical complications have become less hazardous, yet still require all the skill at the command of the accoucheur. We must not rely on all the grand aids at our disposal to the detriment of the fine judgment required in our art. These aids have made Caesarean section—often an obstetrical admission of failure—an operation which can be undertaken under circumstances formerly well known to be lethal or likely to result in a 'near miss'. The 'near miss' is often followed by far-reaching mental and physical sequelae. In order to prevent maternal or foetal conditions from deteriorating to such a degree that all these aids have to be summoned to prevent utter catastrophe, a knowledge of clinical entities, superimposed upon basic clinical principles, is essential. Clear understanding of clinical entities, together with skilful care and judgment, are prerequisites to obtaining the desired effect for mother and child, and for this clear understanding certain basic principles must be understood and known. Failure is a most humiliating experience—especially if the answer is known yet was not considered at the opportune time.

Because of the trouble and the terrible outcome that constriction-ring dystocia often causes, it should be brought to mind whenever there is evidence of an increasing departure from the normal characteristic physiological features of labour.

Constriction-ring dystocia can best be defined as *an abnormal labour which is either due to, or responsible for, the production of a circular, or more or less circular, ridge of uterine muscle protruding into or disturbing the normal contour*

\* From an address delivered at the Congress of the South African Society of Obstetricians and Gynaecologists and the Regional Council of the Royal College of Obstetricians and Gynaecologists, Cape Town, April 1957.

of the uterine cavity. The constriction-ring may be found during any stage of labour, most commonly situated at the junction of the upper and lower uterine segments. It may be situated in the upper segment or even in the lower segment. More than one area may be affected simultaneously.

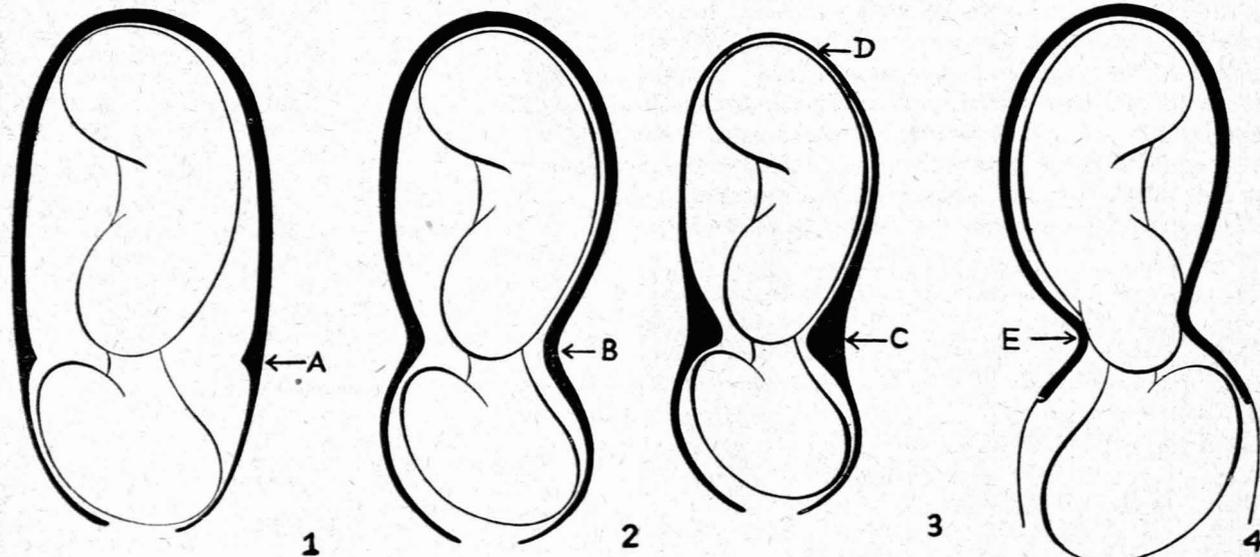
The emphasis of this paper will be on the rings found during the first two stages of labour. The commonest synonym for constriction-ring is contraction-ring, and these terms are to be clearly differentiated from Bandl's ring or the retraction ring, i.e. the normal demarcation between the upper and lower segments. This slight ring-like elevation can be felt within the uterine cavity in some cases (Fig. 1).

Very little is known about constriction-rings, but for purposes of clarity it may be stated that they tend to fall into 2 main groups, as follows:

1. The ring may be just a localized circular area of spasm of the uterine musculature (Fig. 2). It is readily conceivable that by some mechanism (possibly the administration of a drug) this spastic ring may be actively relaxed so that normal uterine action ensues. It may presumably also be prevented by good antenatal care, by paying attention to the psychical (tranquillity) aspect. This type of ring has been referred to by Rudolph<sup>1</sup> as 'reversible'.

2. A localized circular ridge of uterine muscle may be found projecting into the uterine cavity entombing the whole or portion of the foetus behind its grip. The uterine muscle in the affected region is thick (Fig. 3). The upper segment can be seen thinned out from the fundus towards the ring—as the lower segment also may be. Rudolph has classified this group as 'irreversible'. This ring seems to be part and

Fig. 1. A=Bandl's or retraction-ring.  
Fig. 2. B=Constriction-ring around baby's neck.  
Fig. 3. Case 1. C=Irreversible constriction-ring. D=thin upper segment.  
Fig. 4. Case 3. E=Constriction-ring around anterior shoulder.



parcel of a grossly abnormal type of uterine action; its correction would therefore conceivably require a complete readjustment of uterine action. This type of ring has been shown by Miles Phillips<sup>3</sup> to persist even after the death of a patient. In the case described by Dauvillier<sup>3</sup> the ring was so tight that it produced oedema of the trapped foetal leg.

One of my patients (F.R.) was gravely ill on admission to hospital as an emergency. She had been in painful labour for 3 days. Vaginal examination confirmed the diagnosis of a tight constriction-ring. After resuscitative measures, Caesarean section was performed. At operation a thick steel-like ring had to be incised in order to release the foetus. The patient died 4 days later of pyelonephritis, and post-mortem examination revealed that the area occupied by the constriction-ring was still readily visible, despite the fact that the uterus had had ample time for complete physiological recovery.

In order to demonstrate certain features of constriction-ring dystocia, summaries of a few pertinent cases will be given. Thereafter an attempt will be made to weave a story through this structure.

#### CASE SUMMARIES

*Case 1.* F.A., a 42-year-old 14-gravida, was admitted after being in labour for 40 hours. She had not received antenatal care. No previous labour had lasted for more than 12 hours. Examination revealed a R.O.P. position. The os was 3 fingers dilated and loosely applied to the vertex, which was about 1 cm. above the ischial spines. There was slight caput formation and no moulding. The foetal head remained stationary in the pelvis during contractions, which were abnormally painful. Caesarean section revealed a thick ring around the neck of the foetus. The lower segment was thicker, and the upper segment thinner, than normal (Fig. 3). The live child weighed 8 lb. 3½ oz.

*Case 2.* An 18-year-old primigravida (M.C.B.) was admitted in labour at term. Antenatally the foetal head had not engaged. Pelvic assessment, clinical and radiological, revealed a largish baby but no cephalo-pelvic disproportion. The patient complained of irregular pains which were mostly situated in the back and just proximal to the symphysis pubis. After 19 hours of labour the os was 1 finger dilated. Examination after a further 10 hours of inefficient labour revealed a 2 finger dilated, poorly effaced, poorly applied cervix. Hyoscine compound B was given, together with intravenous dextrose. When 72 hours in labour—with good rests—neither caput nor moulding were found on examination. The head did not descend during a contraction. Abdominal examination revealed a steep depression between the upper and lower segments. At Caesarean section the picture demonstrated in Fig. 2 was found. The live baby weighed 9 lb. 6½ oz.

*Case 3.* A 42-year-old 8-gravida (Mrs. v.Z.) was an antenatal case suffering from essential hypertension. Her blood pressure ranged between 150/100 mm. Hg. and 170/100. There was no albuminuria. Labour was induced when she was 35 weeks pregnant because of the steadily rising blood pressure. The method employed was hot bath, castor oil, enema and high puncture of the membranes followed by a pitocin drip. Contractions were poor throughout labour. With the appearance of the head at the vulva and a delayed second stage, forceps were applied, to no avail. The instruments were removed and further vaginal examination revealed a constriction-ring around the foetal posterior shoulder, chest and anterior arm; the anterior shoulder was through the ring (Fig. 4). Amyl nitrite was administered, the ring softened and the baby was extracted. When the placenta was removed manually a ring was still encountered.

*Case 4.* A.S., a 26-year-old primigravida 36 weeks pregnant, was admitted as an emergency case. She had been in labour for 40 hours when her doctor applied forceps but failed to extract the foetus. On admission maternal and foetal conditions were satisfactory. The vertex presented in the L.O.A. position. The os was fully dilated, there was neither caput nor moulding. A constriction-ring was felt around the neck of the foetus. Deep

chloroform anaesthesia and amyl nitrite had no effect on the ring. When Caesarean section was performed the ring was found to be more marked on the *left* side (Fig. 6). The live baby weighed 5 lb. 4 oz.

*Case 5.* Mrs. P., a 26-year-old primigravida, was 3 weeks overdue. She was in a poor, indefinite type of labour with an L.O.P. for about 140 hours. Her main complaint was a continuous pain on the *right* side which was much aggravated when her bladder filled. At no time was there any caput or moulding. The cervix remained thick and poorly applied. At Caesarean section the ring was found to be thick and marked on the right side and present only to a minor degree on the left side (Fig. 6). The live baby weighed 8 lb. 12 oz. The story and findings in this patient are not unlike those described by Allen.<sup>9</sup>

Cases 4 and 5 may well indicate that the reversible type of ring was gradually progressing to the thick steel-like irreversible one. On the other hand, they may be examples of unilateral congenital uterine abnormalities, but of patterns different from those described by Palmer.<sup>4</sup> The abnormality in these cases might be one of function. The rings described up to this point have all been situated at or near the junction of the upper and lower uterine segments. Case 6, which follows, is of interest as demonstrating the occurrence of a constriction-ring in the upper segment (Fig. 7).

*Case 6.* Mrs. C., a 37-year-old 5-gravida, was admitted as an emergency case, having been in labour for 12 hours, bearing down for 1½ hours. Her previous labours had been normal. Examination revealed a tired patient with a thick oedematous cervix just visible through the vulva. Morphine and intravenous dextrose were immediately prescribed. Four hours after admission the nurse reported that a deep depression had appeared in the patient's umbilical region. On examination a deep sulcus in the uterus at the level of the umbilicus was both seen and felt. The cervix was still 3½ fingers dilated and poorly applied to the vertex (R.O.P.) which receded with each contraction. A classical Caesarean section was performed in order to sever the ring and deliver the live 7 lb. 9½ oz. baby.

Whatever the aetiology of the ring in case 6 might be, it undoubtedly developed and did not respond to anaesthesia. It had to be severed to free the baby and it was situated in the upper segment. Case 7, which follows, is of great interest because the patient presented with a constriction-ring in the lower segment and another at the junction of the upper and lower segments (Fig. 8).

*Case 7.* E.S., a 26-year-old primigravida, attended the antenatal clinic regularly from 25 weeks gestation onwards. No abnormality was detected at any stage of pregnancy. She was admitted to hospital with the story that her membranes had ruptured about 6 days previously and that she had been in labour for about 17 hours. Examination showed normal temperature, pulse and respiratory rates; L.O.A. position with the head engaged. The foetal heart was not heard. The contractions were regular. She experienced severe pain during contractions and a persistent lower abdominal pain during uterine diastole. Vaginal examination revealed a loosely applied 4 finger dilated cervix with a constriction-ring below the vertex (at or just above the level of the internal os). It was thought that this os was a loose one, really fully dilated. In the theatre, under general anaesthesia, she was examined once again. The constriction-ring below the head of the foetus had relaxed completely. In feeling around the baby's neck a further vice-like constriction-ring was felt. At operation the ring had to be severed in order to release the 7 lb. 10 oz. macerated foetus.

*Case 8.* The next case is included for the sake of completeness. It was published in 1947.<sup>5</sup> A 27-year-old 4-gravida was admitted as an emergency case. She was at term, with a story that foetal movements had ceased and that the labour pains were poor and irregular. At odd intervals blood escaped from her vagina. Having had rigors and being too ill to get out of bed, she sent for a doctor who had her admitted to hospital. She was very ill, and there was gas in the pregnant uterus, which did not contract, even when pituitrin was injected. The cervix was soft and 2 fingers dilated.

A rigid channel, admitting one finger only, had to be traversed before the head could be felt. Hysterectomy revealed a gaseous distended uterus with a thick ring distal to the foetal head. The diagnosis of angular pregnancy at term complicated by constriction-ring was made, that is to say, the constriction-ring was situated between the angular pregnancy and the rest of the uterus.

GENERAL

The symptoms and signs of constriction-ring dystocia can be summarized as follows:

Multigravidae sometimes volunteer the information that from the start the pains have differed from those of previous labours. Often they complain of rectal pain and pressure. The contractions may be infrequent, irregular and colicky. Pain is experienced before the onset of contractions and lasts until after their cessation. A ring-like depression may be felt abdominally. Often a circular upper segment and a cylindrical lower segment may be seen and felt (Fig. 9).

During diastole it may be possible to push the head into the pelvis, whereas systole tends to raise the head out of, but hardly ever squeezes it into, the pelvis. Vaginal examination often reveals the absence of caput and moulding, a poorly applied cervix, and a recession or failure of descent of the head during a contraction. The rationale of all these findings is obvious, viz. no outward thrust on the part of the uterus. The diagnosis is only positively made when the ring is felt vaginally or seen when a Caesarean section is done.

Treatment may be outlined as follows:

Conservative treatment consists of adequate sedation, antibiotic cover, and resuscitative measures, together with the administration of relaxants. Rucker<sup>6</sup> has had good results with Adrenalin. Should there be no response to conservative treatment, or should there be added compli-

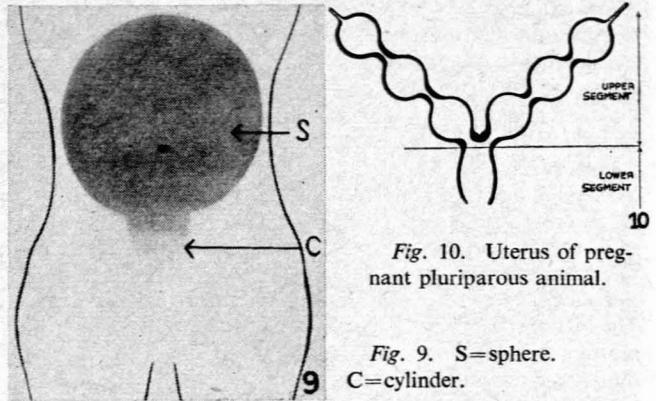


Fig. 10. Uterus of pregnant pluriparous animal.

Fig. 9. S=sphere. C=cylinder.

cations (e.g. hypertensive disease, questionable disproportion, etc.), Caesarean section is the safest procedure. Any other form of treatment carries too high a foetal mortality rate and severe maternal risks.

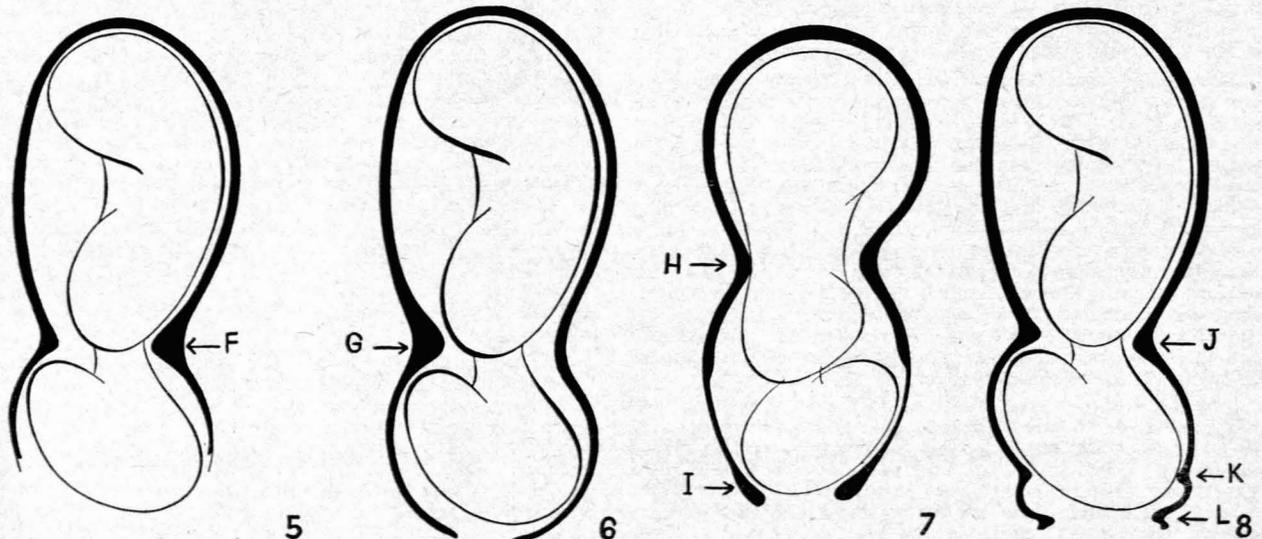
Statistics. During the 5 years 1952-56, of the 37,493 women who were delivered in the institutions falling under the aegis of the University of Cape Town, 56 presented with the obstetrical complication of constriction-ring. Of the babies 16 were stillborn. There was 1 neonatal death. Sixteen patients were primigravidae and 40 multigravidae. Of the latter, 16 had given birth to 7 or more babies. Immunity to constriction-ring dystocia is therefore not conferred by multiparity.

DISCUSSION

Constriction-rings are to be found in the uteri of pluriparous animals. Tribute must be paid to Rudolph and Ivy<sup>1,7</sup> for their work on labour in pluriparous animals, e.g. the bitch. In this animal the pups are contained in segments in the two uterine horns, which represent the upper uterine segment in the human female (Fig. 10).

Physiological constriction-rings form (a) between the one horn and the lower segment, whilst the other is emptying, and (b) in between the young to prevent locking and impaction. These rings, therefore, are situated (a) at the junction of the

Fig. 5. a Case 4. F=Constriction-ring, more marked on left side.  
 Fig. 6. Case 5. G=Constriction-ring, much more marked on right side.  
 Fig. 7. Case 6. H=Constriction-ring around baby's waist. I=3½-finger dilated oedematous cervix.  
 Fig. 8. Case 7. J=Constriction-ring around neck. K=Constriction-ring proximal to largest cephalic diameter. L=4½-finger dilated cervix.



upper and lower segments and (b) in the upper segment. In the pregnant monkey Ivy *et al.*<sup>8</sup> have shown that stimulation of the lower segment produces a reversal of the normal uterine contraction wave.

Definite conclusions cannot be drawn from these facts; through these facts it has, however, been suggested that under certain conditions (possibly 'stress') the uterine labour mechanism shows atavistic tendencies and that under this influence rings may be formed at the junction of the upper and lower uterine segment, corresponding to the junction of the uterus with its horns in pluriparous animals (cases 1, 2 and 3). These may even be unilaterally situated, as is demonstrated by cases 4 and 5 (Figs. 5 and 6). Rings may also be found in the upper segment, possibly corresponding to the physiological rings found in uterine horns (cases 6 and 8).

The physiology of uterine action is not fully understood. It cannot be said to be completely under psychological control; anyone who has seen a number of deliveries is aware of the fact that some patients who are in dire fear of labour have relatively straightforward deliveries. On the other hand, apparently placid individuals may suffer from incoordinate uterine action. Constriction-ring dystocia is found in primigravidae, multiparae and multi-multiparae and, as has been pointed out, may be found for the first time in a patient giving birth to her 14th baby. Early rupture of the membranes may occur in any normal or abnormal labour, as may also abnormal presentations. Intra-uterine manipulations and oxytocic drugs may predispose to ring formation, but they are not the sole aetiological factors. Labour is often induced by means of rupture of the membranes and the use of oxytocic drugs; yet it is an absolute rarity to find a constriction-ring dystocia in these cases. The uterus belongs to the system of hollow muscular organs. Because of the time factor and the foetal and maternal complications involved, an abnormal reaction on the part of the uterus is a much more serious event than is a spastic colon for example. A patient suffering from spastic colon complains of inability to have a proper motion. The colon becomes 'knobbly' around balls of faeces not unlike the colon of the goat or

sheep. However, this is not considered an atavistic tendency on the part of the gut. The time factor in spastic colon is not of great importance, whereas in labour it is of the utmost significance. Atavism, therefore cannot be loosely accepted as an aetiological factor. However, it is possible that the sites of constriction-ring formation have evolutionary significance.

Physical interference acting in an individual with an abnormal psychical background, as is found in most cases of spastic colon (i.e. a tenseness produced by some minor degree of psychological imbalance), may be at the root of the evil. The psychological explanation is an excellent shelf upon which to place unexplained phenomena and so unburden the mind of difficulties. It is not known whether a patient who, having had proper antenatal care, has *inter alia* been taught self-reliance, has developed constriction-ring dystocia. Not until the basic physiology of the different varieties of smooth muscle is understood will this closed door be opened.

#### SUMMARY

1. The constriction-rings of labour are defined.
2. Case histories of a few patients are briefly given in order to demonstrate the different situations in which constriction-rings have been encountered.
3. The symptoms, signs and treatment of constriction-ring dystocia are briefly outlined.
4. A few aetiological features are considered. Unfortunately, firm conclusions cannot be drawn from either argument or observation.

#### REFERENCES

1. Rudolph, L. (1935): J. Obstet. Gynaec. Brit. Emp., **42**, 993.
2. Phillips, M. H. (1934): *Ibid.*, **41**, 497.
3. Dauvillier, P. W. (1951): Ned. T. Geneesk., **95**, 535.
4. Palmer, A. C. (1951): Proc. Roy. Soc. Med., **44**, 867.
5. Louw, J. T. (1947): J. Obstet. Gynaec. Brit. Emp., **54**, 477.
6. Rucker, P. (1946): Amer. J. Obstet. Gynec., **52**, 984.
7. Rudolph, L. and Ivy, A. C. (1930): *Ibid.*, **19**, 317.
8. Ivy, A. C., Hartman, C. G. and Koff, A. (1931): *Ibid.*, **22**, 388.
9. Allen, L. A. (1952): S. Afr. Med. J., **26**, 398.