



IVH Care Bundle (IVHCB) success pillars

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Abstract

BACKGROUND: Premature infants (PT) (< 32 weeks gestation) and low-birth-weight infants (< 1,500 g) have higher risk to have IVH. In Saudi literature showed rate ranged between 13-27%. Grade 3-4 IVH (severe) is associated with increased of adverse outcome like death.

METHOD: A multidisciplinary team undertook interventions including in-service training, prompt initiation of IVHCB, revision of guidelines, and process standardization. Baseline data were collected from december 2021 till november 2023 (phase1), with interventions occurring from december 2023 to november 2024 (phase2).

RESULTS: In phase 1 all IVH rate was 9.6%, severe IVH 5.4% and mortality was 18.5%. Phase2 all IVH 8%, severe IVH 4.4% and mortality reduced to 6%.

CONCLUSIONS: Interventions focused on enhancing adherence to an IVHCB at different pillars were associated with a reduced rate of mortality, all & severe IVH in high-risk neonates.

Introduction

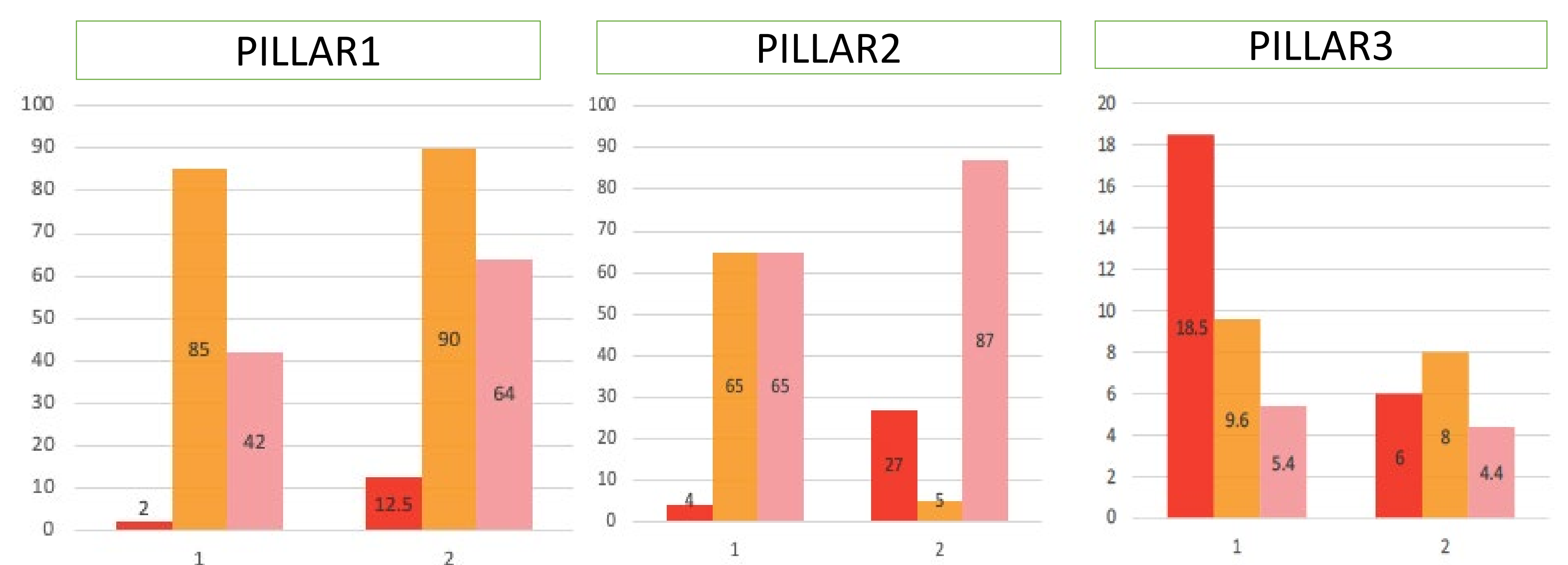
Intraventricular hemorrhage (IVH) in neonate consists of bleeding into the ventricles. In premature infants (< 32 weeks gestation) and low-birth-weight infants (< 1,500 g) the risk is increased and varied between units. In Saudi literature showed rate range between 9-27%. Grade 3-4 IVH (severe) is associated with increased of adverse outcome like death.

Methods

We conduct this quality improvement QI project on 2 phases. A multidisciplinary team undertook interventions including in-service training, prompt initiation of IVHCB, revision of guidelines, and process standardization. Baseline data were collected from december 2021 till november 2023 (phase1), with interventions occurring from december 2023 to november 2024 (phase2). Phase 1 retrospective assessment for all inborn premature babies who delivered at gestational age 32 weeks or below or 1.5kg and below. Phase 2 prospective assessment for the same age category. Phase 1 was taken for the period of 2022-2023 and prospective for 2024. We implement new care bundle on 3 pillars (antenatal, natal, postnatal). So, we concentrate on antenatal with maternal team interventions like consultations, steroids, mg sulphate and delayed cord practices. Natal on resuscitation practices and to follow gentle resuscitation and new NRP policy and postnatally by implementing golden hour and more noninvasive measure (noninvasive ventilation, no boluses, less inotrope usage, midline position, pain control). Implementing this new care bundle went through serial educations to different teams, simulations and auditing. All out born baby and if baby died before head imaging were excluded. This QI was accepted by hospital quality department. We targeted IVH reduction by 30-50%.

Results

In phase one 146 babies were assessed compared to 67 in 2024. Median Gestational age was 29 in phase 1 and 29.5 in phase 2. Male represent 53% in phase1 while 55% in phase2. Female was 47% in phase1 & 45% in phase2. Antenatal pillar showed very low consultations in phase1 with 2%, 85% steroid coverage and 42% mg sulphate coverages. While phase2 consultation increased to 12.5%, steroid to 90% and mg sulphate to 64%. Natal pillar showed in phase1 surfactant was given to 65% in DR & 5% in phase2. Delayed cord clamp was practiced for 4% in phase1 while increased to 27% in phase2. Thermal normality was reached at admission in phase1 with 65% and in phase2 to 87%. Postnatal pillar showed 60% was ventilated invasively in phase1 and 43% in phase2. All IVH rate was 9.6% in phase1 and reduced to 8% in phase2 and severe IVH in phase1 5.4% and reduced to 4.4% in phase2. Mortality was happening in 18.5% in phase1 and reduced to 6% in phase2.



Discussion

- We went through 5 PDSA cycles almost quarterly per year, we were able to improve adherence in our unit to IVHCB for neonates born <32wks or <1500 g. This improvement in adherence was reflected in a decrease in all and severe IVH from 9.6% to 8% and from 5.4 to 4.4. Mortality dramatically reduced from 18.5% to 6%. With QI interventions including education of staff, prompt initiation of the IVHCB, revision of guidelines, and process standardization, IVH rates decreased, with more adherence in different pillars. Starting by antenatal as more coverages of antenatal steroids from 85 to 90% and mg sulphate from 42 to 64% and antenatal consult from 2 to 12.5%. Natal pillar more adherence for IVHCB reflected on better thermal normality at admission from 65 to 87%, also receiving surfactant in delivery room was planned to reduce it and give it post confirm the ETT and in better setup in first 2 hours and adherence make it from 65 to 5%. Delayed cord clamped improved from 4 to 27%. Postnatal pillars with adherence to IVHCB noninvasive ventilation reduced from 60 to 43%. All IVH was reduced to 8% from 9.6% and severe IVH (grade III and VI) from 5.4 to 4.4%. The main impact was seen on mortality which reduced from 18.5 to 6%. In the literature there is some variations between the efficacy of such care bundle some showed no much efficacy while others did like Murthy et al in 2020 reported improved outcomes with decreased death or severe brain injury in infants exposed to an IVHCB while in Persad et al in 2021 showed no improvement in rates of severe IVH in patients exposed to an IVHCB; however, compared with our pre-IVHCB group, their IVHCB-exposed group had significantly lower birth weights and gestational ages. Our mean gestational age was almost 29 weeks which is not very low. To strengths this QI we included a multidisciplinary approach involving multiple PDSA cycles. We involved also important stakeholders in this effort like obygne and we received a diversity of input that was very valuable, particularly from frontline staff. We developed a wide range of factors in different pillars to see which we have more gaps, and we need to improve it and enhance adherence to it.

References

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